School Shop

vol. XV no. 9
MAY 1956

Time Is of the Essence
by William E. James

Aluminum Fireplace Set
by Kenneth G. Wise

Fly-Tying Vise
by Herbert W. Yankee

Teaching General Drafting
by Walter C. Brown

Cover story: Eighth-graders busy at their projects in the woodworking class of James Monroe Junior High School, Seattle, Washington, illustrate the instructor's problem of how to parcel out his rationed time. Story on page 7.

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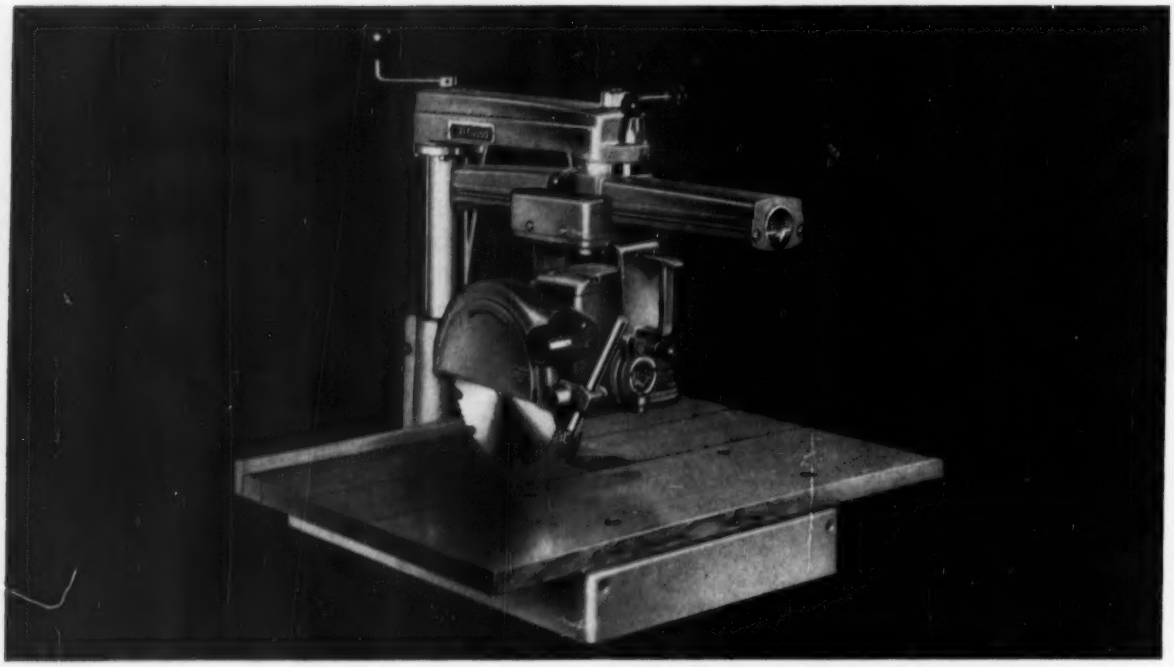

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Out Our Neck We Stick

While travelling in Germany we observed a sign in a railway carriage which intrigued us no end. Our interest in the notice induced us to conduct some research to discover what the authorities wished us to do—or not to do. So, with the aid of our high-school German, we proceeded to translate the message into understandable English. As a result of our efforts we discovered that passengers, under the penalty of 50 marks, must not "out of the window their heads stick."

To an American this seemed to be an awkward method of telling the public that it is illegal to view the landscape from a point outside the confines of the carriage. While tossing a verb in at the end of a sentence seems odd to us, it raised the question in our mind as to whether we, in industrial education, were always as clear in our statements as we might be.

While it is not mentioned as frequently as its value merits, we believe that teachers will agree that, in addition to skill and technical knowledge, pupils should be prepared to express themselves simply and clearly in oral and written English. The skills and knowledge may enable them to perform the operations called for in doing a job. However, if they lack the ability to convey their ideas to others, their success will be relatively limited.

Since one means by which pupils learn to use proper English is through the examples they hear and see around them, it occurred to us to examine ourselves. With an open mind, we began to look around for some evidence on the matter. What we found is rather disturbing, since it appears to indicate that oddities in oral and written expression are not confined to those found in Germany.

One teacher recently announced, via a notice written on the blackboard, that "Pupils are expected to make their sanitary arrangements before they come to class." While the intent of this rule may seem obvious to some, we are of the opinion that it might lack clarity to a group of immature youngsters.

Another gem appears in the statement that, "Methods have been devised to overcome such faults as hitting a small hole in the can." This too is suggestive of more than one activity, and it might be embarrassing if it was left to the pupil to select the particular can he was shooting at.

Another fellow advises us that, "If you don't want the parents complaining to the front office, it would be wise to be fair and non-prejudiced." This causes us to wonder if the possibility of parents complaining is the only reason for treating pupils fairly?

What do you think of this one? "When dry, add additional coats by spray or brush of the desired color." One might be excused if he inquired whether the proper color of the spray or brush must be assured, or does the color have some significance in regard to the additional coats to be applied?

In a discussion of nails one author informs us that, "the most common lengths are from ½″ to 3″, with diameters from 4″ to 12″. Rather stout for a nail, is it not? No doubt the author intended to convey the idea that nails are frequently distinguished by numbers, and what he was really referring to was #4 and #12. Or was he?

Another teacher decorated a machine with a typewritten warning that pupils should "refrain from using the machine unless accompanied by a teacher." Another teacher attempted to make clear to his pupils that they must not leave the room until they had seen the teacher. To the experienced observer the intent of both of these injunctions is clear, but we have no means of knowing what interpretation a 12-year-old pupil might put on them.

The items included here, and others that might have been added, were observed in classrooms or were cribbed from the pages of material which was written by competent people who are thoroughly familiar with the English language. Although they have been compiled as a result of a rather limited survey, there is sufficient evidence here to indicate that there is room for improvement in our use of language, even by the editors of SCHOOL SHOP.

While the language used in most of the literature in our field is good, the foregoing does suggest that, if we are to influence our pupils to avoid careless expression, we must show them by our example that ambiguous statements may lead to serious errors.—*T.D.*

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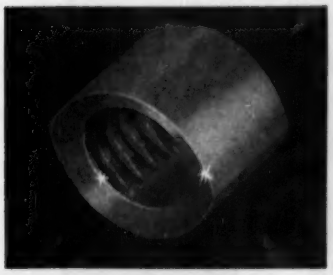

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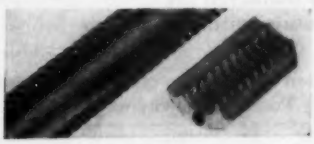

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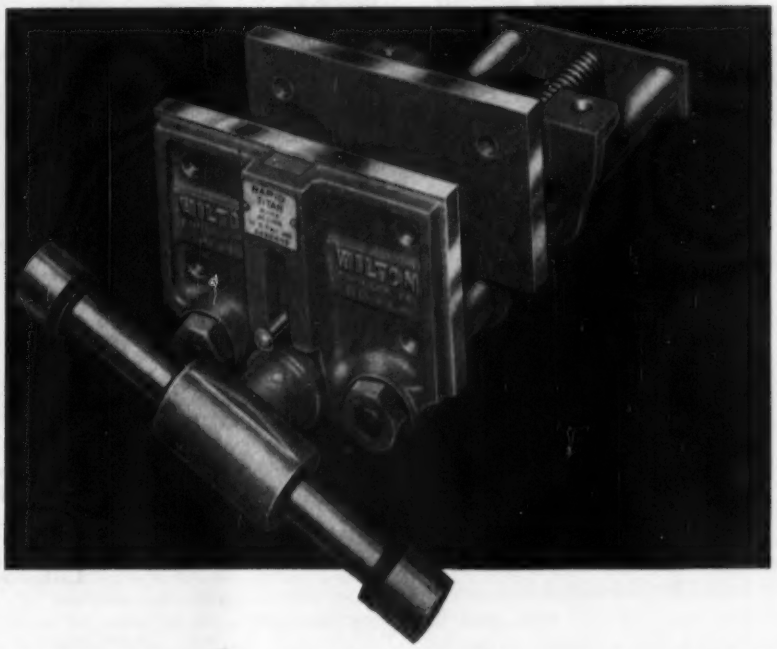

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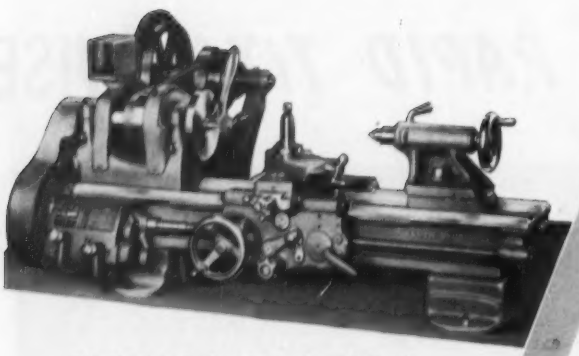

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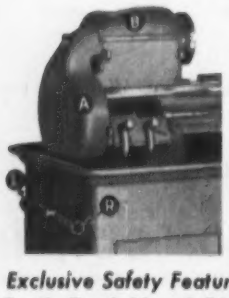

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Are We Barking up the Wrong Tree?

Time Is of the Essence

By William E. James

Industrial Coordinator, Anderson, Indiana, Public Schools

NEW school construction is at its highest peak in history. Modern, well-designed schools are popping up in almost every community across the nation. And, for the first time for many of them, industrial-arts teachers are looking straight out a broad expanse of window across a newly sodded lawn or macadam playground — instead of up into the clouds through a narrow basement window well. Industrial-arts shops are finally "coming up out of the basement."

Does this mean that industrial arts has come of age, that it has finally achieved recognition as an integral and essential part of the curriculum? Or is it merely that a large percentage of new school construction is designed sans basement? Whatever the cause or causes, industrial arts is being, and will be, called on, as planning for each new school is begun, to justify its purposes and objectives as a basis for anything it hopes to gain as an outcome of that planning.

Is industrial arts in a sound position to meet this challenge? Can it justify its purposes and objectives to gain more and larger shops, more equipment, greater number of periods per week per class, perhaps more courses as required courses for all students, girls as well as boys?

Progress depends on the clear, meaningful, unanswerable logic with which the case for industrial arts as a basic fundamental phase of the curriculum is presented to a school administration. Perhaps there has never been a time when exhaustive, coldly analytical study of the purposes and objectives of industrial arts is more important to industrial-arts teachers than it is today.

The Last Soul Searching

The last great soul searching about the purposes and objectives of shop activities occurred when the "new psychology" invalidated the manual-training concept of training for coordination of the hand and eye. Since then, continuing new developments in both educational psychology and philosophy have perpetuated that soul searching until only in the past decade or so has there been any degree of crystallization of thinking around a new set of purposes and objectives. What are those purposes and objectives, and how well do they serve industrial arts in its struggle for a place in the educational sun?

First of all, the extent of present agreement on a definition of industrial arts is reflected in these three quotations:

1. Industrial arts is a phase of general education that concerns itself with the materials, processes, and products of manufacture and with the contribution of those engaged in industry.[1]

2. Industrial arts . . . assists boys and girls to understand the industrial and technical aspects of life today . . . The industrial arts are centered mainly around significant aspects of the manufacturing and construction industries and their effects on daily living.[2]

3. Industrial arts is "those phases of general education which deal with industry—its organization, materials, occupations, processes, and products—and with the problems resulting from the industrial and technological nature of society."[3]

According to these authoritative sources then, industrial arts is in brief (1) a phase of general education for all boys and girls, and (2) a study of industry. And what purposes and objectives are to be accomplished through this study of industry?

The following statements are taken from two of the above-mentioned authorities plus two additional sources:

1. To explore industry and American industrial civilization in terms of its organizations, raw materials, processes and operations, products, and occupations.[4]

2. To develop in each pupil an active interest in industrial life and in methods of production and distribution.[5]

3. Understanding of industry and methods of production and of influences of industrial products and services upon the pattern of modern social and economic life.[6]

4. An understanding of industry, its workers, and processes.[7]

The foregoing statements of definitions and objectives are familiar to any teacher of industrial arts. He has read them, studied them, until he can almost recite them upside down, forward, and backward. But how often it is merely a recitation, a parroting of words and phrases without any analysis of a real and full meaning of the words and phrases.

What Is "Industry"?

Consider for a moment the word industry itself. What does it mean? What is its real form and substance? Is it, or can it be, truly represented by our industrial-arts shops? *The Standard Classification Manual*, published by the Executive Office of the President, Bureau of the Budget, Washington, D.C., lists nine divisions of industry in the United States at least four of which are somewhat related to traditional industrial-arts shop activities. Those four are: Construction; Manufacturing; Transportation, Communications, and Other Public Utilities; and Services.

Under Construction are listed two major groups: general contractors and subcontractors.

Under Manufacturing are listed 20 major groups: food and kindred products; tobacco manufacturers; textile-mill products, apparel, and other finished products made from fabrics and similar materials; lumber and timber basic products; furniture and finished lumber products; paper and allied products; printing, publishing, and allied industries; chemical and allied products; products of petroleum and coal; rubber products; leather and leather products; stone, clay, and glass products; iron and steel and their products; nonferrous metals and their products; machinery (except electrical); electrical machinery; transportation equipment

[1] Newkirk, L. V. *Organizing and Teaching the General Shop*, Peoria, Illinois: The Charles A. Bennett Co., 1947, p. 15.

[2] *Industrial Arts in Education*, Washington, D.C.: American Vocational Association.

[3] Wilber, G. O. *Industrial Arts in General Education*, Scranton, Pa.; International Textbook Co., 1948, p. 2.

[4] *Ibid.*, p. 42.

[5] Gruhn, W. T., and Douglass, H. R.: *The Modern Junior High School*, New York: The Ronald Press, 1947, p. 164.

[6] Ericson, E. E. *Teaching the Industrial Arts*, Peoria, Ill.: The Charles A. Bennett Co., 1946, p. 250.

[7] Newkirk, *Op. Cit.*, p. 44.

(except automobiles); automobiles and automobile equipment; miscellaneous manufacturing industries.

Under Transportation, Communications, and Other Public Utilities are listed: railroads; street, suburban, and interurban railways; highway passenger transportation; highway freight transportation; water transportation; air transportation; pipe-line transportation; warehousing and storage; services incidental to transportation; communication; heat, light, and power; water and sanitary services.

Under Services are listed such industries as personal services, automobile repair services and garages, miscellaneous repair services and hand trades, motion pictures,[8] etc.

How to Study Industry

Assuming that this is a description of the industry which the authorities had in mind in their definitions and statements of objectives, let us look again at one of those statements of objectives and then at some of the methods by which the author would accomplish the objective.

Wilber's objective states "to explore industry and American industrial civilization in terms of its organization, raw materials, processes and operations, products, and occupations."[9] He would accomplish his objective through the following lessons, projects, and activities:

1. A discussion lesson on the general organization of industry. Explain the duties and function of the board of directors, stockholders, president, general manager, superintendent, foreman, etc. Show lines of authority.

2. Develop a personnel organization with the group, and point out its similarities and differences in comparison with industry. Work out the duties of each member of the organization.

3. If possible visit a typical industry, and talk with the superintendent, foreman, etc., about their work and responsibilities.

4. Have meetings with the officers of the school personnel organization, and discuss problems and develop effective techniques.

5. Assign readings about certain carefully selected industries and industrial products. Choose those, at first, which are naturally interesting to youths, such as the iron and steel industry, the rubber industry, the production of uranium and plutonium.

6. Have reports given on readings. Control these so that they will be short and snappy.

7. Discuss reports to bring out important points. Stress importance of industry in our "way of life."

8. Encourage students to clip and bring in newspaper or magazine articles dealing with industrial topics.

9. Plan industrial visits which will give opportunities to observe industrial processes and methods.

10. When giving demonstrations, point out similarities of, and differences between, school-shop methods and industrial methods.

11. Organize at least one project in each class on a production basis and make comparisons with industrial methods.

12. Encourage students to use industrial processes and methods wherever practical in their school projects.

13. Use motion pictures and other visual devices to illustrate industrial processes.

14. Recommend and assign readings which describe new or unusual processes of industry.

15. Plan industrial visits, and stress the importance of looking for definite things.

16. Have reports on industrial visits.

17. Use motion pictures to supplement trips or where trips are not feasible.

18. Encourage students to plan and make their own trips.

19. Exhibit various raw materials and talk about them with the class.

20. Assign readings and reports about raw materials.

21. Use motion pictures, slides, pictures, and other visual aids to illustrate the characteristics, transportation, and uses of raw materials.

22. Develop a collection of raw materials in the school or shop museum.

23. Encourage the use of a variety of raw and semifinished materials in student projects. Explain their uses and limitations.

24. Assign readings about various occupations. Discuss with the class the important points to consider in the study of an occupation.

25. Use motion pictures, etc., to show the work of various occupations.

26. Discuss with class the requirements for entering various occupations.

27. Have students prepare a guidance folder covering an intensive study of some one occupation.

28. Talk with students individually about their probable future vocations. Give advice and guidance.

29. Visit industries and study the work of employes. Analyze these occupations after return to the classroom. Encourage students to make such visits on their own initiative.

30. Invite representatives of various occupations to speak to classes.

31. Encourage students to talk with friends and parents concerning various occupations.

32. Prepare a quiz on various occupations and have members of class fill it out.

33. Have the class study the uses made by industry of the important materials. Relate these uses to applications in the school shop.

34. Check plan sheets carefully for the correct use of materials.

35. Show by demonstration and example the correct use of materials.

36. Discuss with the class the limitations of various materials, and show what happens when materials are incorrectly used.

37. Assign readings and reports on various phases of the management-labor problem.

38. Discuss the problem of labor and management in class. Present both sides.

39. Use the bulletin board and shop displays to stimulate interests in new developments.

40. Use motion pictures of new processes and materials.

41. Call attention to new developments during industrial visits.

42. Encourage students to bring in clippings and magazine articles concerning new developments.

43. Use new materials in demonstrations where possible."

As indicated by these lessons, projects, and activities, much of the accomplishment of this objective will depend on "related study." Wilber makes the point that objection is inevitably raised to insufficient time to carry on such a study, but he contends "that if 15 percent of all class time . . . is used effectively, students may be expected to get a fairly accurate, even if incomplete, picture of American industry."[11]

15 Percent Is How Many Hours?

The figure, 15 percent of all class time, does not define, however, the precise amount of time which would be given to this study. No reference is made to any given number of semesters which the course might encompass. Neither is any reference made to the number of days per week or amount of time per day the course will meet.

Thus 15 percent of all class time would total less than 16 hours for the boys taking only the required industrial-arts courses meeting two 55-minute periods per week during the 7B, 7A, and 8B semesters. The same 15 percent could total over 40 hours for boys taking required industrial-arts courses meeting 12 weeks each year, five 55-minute periods per week, during grades seven and eight, and an elective course in the ninth grade meeting five 55-minute periods per week for 36 weeks.

In the latter example, however, does the ninth-grade course meet the criteria of industrial arts as general education, since it is an elective course, or does it become a special-education course? Wilber apparently concludes that it is general education. In fact, referring to carrying on the study of industry through the different grade levels, he states that, "It is assumed that a seventh-grade group in a general-shop class would not go so extensively into a study of the metal trades as would a group of ninth-grade students in a general-metals shop . . . Nor would the ninth-grade group study as intensively the work of the machinist as would a tenth-grade or eleventh-grade group in machine-shop practice."[12]

If it is a function of the school "to give *every* student an appreciation and understanding of industrial civilization as a vital segment of American life"[13]

(*Continued on page 22*)

[8] *Standard Classification Manual*, Bureau of the Budget, Washington, D. C.

[9] Wilber, *Op. Cit.*, p. 42.

[10] *Ibid.*, p. 60-65.

[11] *Ibid.*, p. 95.

[12] *Ibid.*, p. 96.

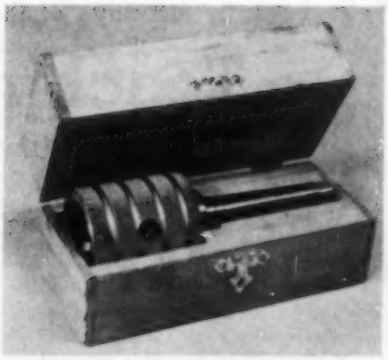
[13] *Ibid.*, p. 1.

A junior-high machine-shop student made this

Tailstock Die Holder

By Richard G. Wibom

Theodore Roosevelt Junior High School, Rockford, Illinois



Ford Motor Co. Photo

Junior-high student Curtis Repka won an outstanding achievement award with this tailstock die holder in the Ford Industrial Arts program.

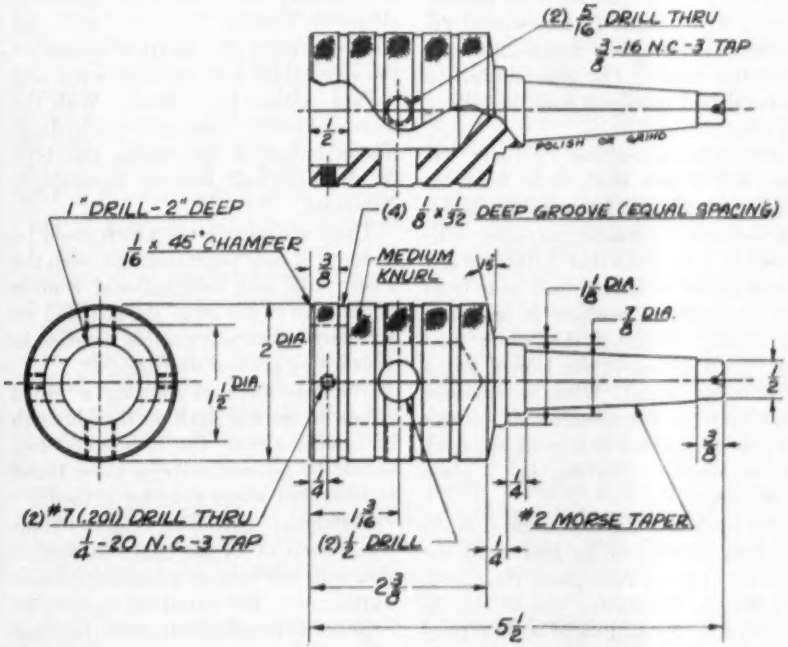
THREADING by hand with a stock and die often finds a beginner in difficulty, particularly in starting the die square with the axis of the work. This can be avoided by use of the tailstock die holder which is used widely in industry.

The tool operates in the following manner. The die holder grips a standard-size button die by the two cup-point set screws in the bored-out portion of the die head. The tapered shank fits tightly in the lathe tailstock and cuts threads on stock held in the lathe chuck which revolves at a slow speed which is regulated by the lathe backgears.

One of my students, Curtis Repka, had a metal-turning lathe in his home workshop and suggested making this accessory to aid him in his threading. Prior to beginning work he made a sketch of the proposed die holder and prepared an outline of the processes he anticipated to complete the project.

The making of the tailstock die holder will challenge the skill and ingenuity of the better students in a junior-high-school machine shop. As an occasional project it will add a variety of worthwhile experiences not found in the normal run of shop projects. This project can be made in most machine shops because after the stock is sawed only the lathe and drill press are needed to complete it. Also the student becomes acquainted with some of the precision measuring instruments such as the micrometer, dial indicator, and surface gage.

The material selected for the project was water-hardened (annealed) tool steel. The stock was first faced to length and centerdrilled at both ends. After turning the outside diameter of the die head and roughing out the outside diameter of the shank, the head was knurled to make the finished product easier to handle with oily hands. To break the monotony of the continuous knurl, four grooves were equally spaced and cut with the parting tool.



The turning of a standard taper for the shank can be done in several ways. None of our lathes is equipped with a taper attachment so we took a tool with the desired taper and mounted it between the centers of the lathe. The tailstock was then offset until an indicator mounted on the tool holder registered zero when moved along the sample taper. As we had no facilities to finish grind the taper, care was taken to turn a smooth and accurate taper.

The stock was then chucked and the stock-clearance hole drilled. In this step the student learned to use a large taper-shank drill mounted in the tailstock. Another new experience was use of the boring bar to make the recess in the die head. It is accurately bored to fit a standard-size button die. The tool was then given a smooth finish with fine-grit emery cloth and oil.

After all the lathe operations are completed, the student is required to drill six holes and later to tap four of them. The holes are accurately located from a surface plate with a surface gage. This includes the customary layout procedure. As shown on the drawing, the two ½" holes are used for chip removal, the ¼" holes are for dog-point set screws, and the ⅜" threaded holes are for adding handles in the event added leverage is ever needed to hold the larger size dies.

To give the die holder durability, it was surface hardened with hardening compound. The knurled portion of the holder was wire brushed to remove the scale. The rest of the holder, with the exception of the stock-clearance hole, was finished with fine-grit emery cloth and oil. As a final touch, these polished surfaces were brought to a brilliant luster with crocus cloth. All of this polishing was done on the lathe. ★

We're back in the days of the Model T when it comes to

Teaching General Drafting

By Walter C. Brown

Associate Professor of Industrial Education, University of Missouri, Columbia

ANYONE visiting a great many industrial-arts departments in Missouri and other states, such as I have done during the past 12 years, would gain the over-all impression that there has been considerable progress made in industrial arts. Progress particularly stands out in the shop areas—shop planning, shop location, equipment, offerings, informational content, and the qualifications of teachers.

But there is at least one serious weakness in industrial arts that stands out clearly—a shortcoming in the area of drafting.

More than anywhere else in industrial arts there is need for a change in the content of the beginning drafting course—general drafting. How much longer are we going to teach boys and girls the type of drafting found in the school programs of a half-century ago? Does general drafting make no other contribution to those who take it than prepare them for engineering colleges or for drafting positions in industry? Is it not possible in this beginning course in drafting to provide rich exploratory experiences, to further understanding of industry and provide consumer values as in other industrial-arts courses?

Content in mechanical-drawing courses consists largely of experiences in instrument manipulation, exercise work, and problems of a pre-engineering drawing nature. We have been providing a narrow course in drafting with emphasis on skill development in a few areas to the exclusion of broader experiences. Despite the fact that some teachers say "most of my boys enter the state engineering college," few students will make use of the skill in lettering and instrument practice that is insisted on in such courses to a degree justifying the emphasis they receive. Far more boys and girls should and could be enrolled in a beginning drafting course that would make a greater contribution to their general education than does mechanical drawing.

Just as there are exploratory and advanced courses in other areas of industrial arts, so should there be in drafting. There is a place in the high-school industrial-arts program for more specialized courses such as architectural drafting, sheetmetal drafting, and machine drafting. In this article, however, we are concerned with content and method in the beginning drafting course—general drafting.

General drafting is a major area course and should be offered in the 10th, 11th, or 12th grade as the first drafting course students take after having had the composite general shop course. Since it is the first course in drafting, it should include several areas in drafting with emphasis on exploratory and consumer values. We can no longer assume that every boy or girl who enters the door of the drafting room is going to become a full-fledged draftsman! It can be expected that all types of students will enrol in the course. Some will become auto mechanics, carpenters, machinists, office workers, sales persons, doctors, and lawyers. A few will choose drafting as a career.

With such a cosmopolitan group of students, we ask ourselves, "What should be included in the general drafting course?"

The problem of selecting content for general drafting is no different from that of selecting content for the comprehensive general-shop course. Most of us would agree that you can't teach everything in a one-year course; so we include those activities, rich in educational experience, that are most dominant in our industrial society. The general-drafting course should include at least the following areas.

Architectural drafting. — There has been, and there is likely to be for some time, a tremendous boom in the building industry. *Fortune* magazine estimated in April 1954 that 1,100,000 new homes would be started each year from 1955 to 1959. Elsewhere it has been statistically calculated that more than half of the houses in the United States are owner-occupied. When we consider these facts in the selection of content for general drafting it is quite apparent that architectural drafting has a place in the course.

The content in the architectural drafting area should not be limited to the drawing of house floor plans, elevations, and details. Instruction should also be provided in the reading of architectural blueprints, the relative advantages of various types of floor plans, the desirable features to consider in planning a house, the advantages and limitations of different types of building materials, etc.

Mechanical drafting.—Problems should be selected from the mechanical-drafting area because of their application and use in the vast number of industrial jobs. However, it should be pointed out in this connection that the large majority of industrial workers are not required to make finished drawings, which are carefully lettered and dimensioned. Rather, they will be required to read from prints and occasionally prepare a sketch of a job to be processed.

Sheetmetal drafting.—Layout work in the sheetmetal industry is another type of drafting which affects most of us either around our homes, our places of work, or directly in our occupation. Heating and air-conditioning ducts, kitchen equipment and vents, and guttering are but a few examples of its use.

Schematic drafting.—Another type of drafting, which differs markedly from the above types, is schematic drafting and should be a part of the general-drafting course because of its frequent use. Examples of this type of drafting with which most of us come in contact are: reading radio diagrams; planning electrical circuits for new and old houses; tracing the electrical system of the automobile; and planning water and sewage systems for a house. With the increased use of electronics and hydraulics in industrial automation, this type of drafting will become increasingly important.

There are other areas which could be included if time permitted, but when the basic skills and informational content of the above four areas are included we will have made considerable progress in broadening general drafting.

There is more to offering a broad course in general drafting than breadth of content alone. The techniques, too, should be representative of those found in situations where drafting is used.

Sketching.—Sketching is a technique which most of us use either in connection with our jobs or around the home. Furthermore, few industrial workers are required to prepare instrument drawings

but nearly all such workers are called on to express their ideas through a shop sketch. The homeowner who can describe the job to be done by means of a sketch is much more likely to get what he wants than is one who lacks this skill of presentation. A course in general drafting should, therefore, provide experience in sketching to enable the individual to express his ideas concerning common objects and problems found around the home and in industry.

Print reading.—By far the greater number of students going through our general drafting course will make more use of their ability to read prints than their ability to make a drawing. Nearly all boys and a great many girls study the diagrams and plans in one or more of the popular magazines. They need instruction in the reading of prints that will enable them to understand the problems presented in the prints and to work from them intelligently. Most of the skills required for this can be gained from their experience in sketching or instrument drafting, but some specific instruction should be provided on various types of prints to familiarize the students with the actual techniques of print reading. This skill, needed by most of our young adults today, is almost totally lacking in any of the academic subjects.

Skill in instrument usage.—No drafting course would truly be representative of industry unless it sought to develop basic skills and understandings in instrument usage. One of the objectives of industrial arts is to interpret industry, and behind every industrial product manufactured or serviced has gone considerable planning and engineering which are expressed in the finished working drawings of industry. The general drafting course should enable the student to develop some basic skills in instrument usage and to understand the work of the draftsman, but the development of pre-employment skill required of beginning draftsmen should be achieved in an advanced industrial-arts or vocational-industrial drafting course.

Demonstrations and class discussions.—The demonstration will be the chief method used by the instructor in assisting the students to develop the skills and procedures of drafting, while the class discussion method will likely be the primary means of presenting the informational content. There are, however, a number of other methods which will greatly enrich the general-drafting course.

Field trips.—A trip to a drafting room in industry to observe the work of draftsmen will provide valuable experiences which are difficult to achieve in any other way. When the class is working in the architectural phase of the general-drafting course, the instructor can plan field trips to houses which are at various stages of construction. Tours of drafting rooms in industry, production plants, sheetmetal shops, and the like can also be arranged in most communities. These field trips provide a knowledge and understanding of industry as well as add "life" to the daily classroom activities.

Botany classes can learn from field trips, so this instructor applied the same principle to his drafting class. The result was an enlightening trip to the site where a new house was under construction.

Speakers from industry.—In addition to field trips, another beneficial method is to have a person with the desired experience speak to the drafting class. Speakers should be selected on the basis of the contribution they are able to make to the students' knowledge and understanding of the field of drafting. The industrial-arts instructor should confer with the prospective speaker so as to provide for maximum correlation between the class activities and the speaker's remarks.

Visual aids.—The content and methods in general drafting can further be enhanced by the use of numerous visual aids relating to drafting. Such things as films, charts, blueprints, project plans in popular magazines, and models are readily available to the alert instructor.

Individual instruction sheets, student reports, and scrapbooks.—In addition to the more commonly used methods described, there are others which can be used effectively in general drafting. Individual instruction sheets are helpful in providing supplemental instruction to individual students as well as directing their activities in some special investigation. Special reports by students not only broaden the experiences of the class but provide desirable experiences in developing selfconfidence and leadership ability. A scrapbook is another method of enriching the course in general drafting. Students may be encouraged to prepare scrapbooks on the particular phases of drafting or industry which interest them. The scrapbook might include pictures, news items, help wanted ads, industrial publications, occupational information folders, etc.

General drafting, as visualized here, is a beginning drafting course following the comprehensive general-shop course. It should be broad in scope to provide exploratory and consumer education values. Skills should be taught but they should not be limited to a narrow range of skills in any one area. Rather than develop a high degree of skill in one area, general drafting should develop basic skills and understandings in several areas. We must keep in mind that we are not training draftsmen in this beginning course but rather we are teaching all types of students. Specialization and skill development in a limited area may be achieved later in an advanced industrial-arts or in a vocational-industrial drafting course for those desiring to become draftsmen.

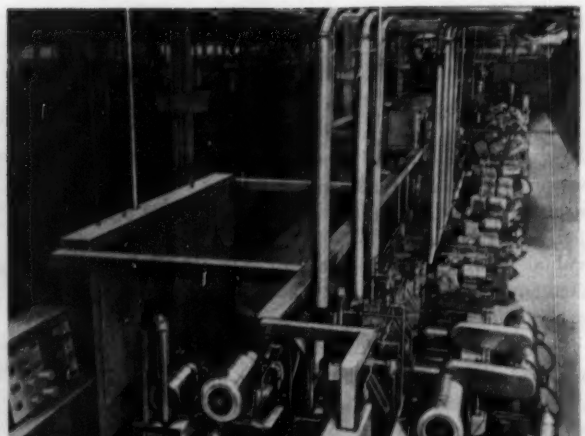
Few courses in industrial arts have as great a potential for achieving the objectives of industrial arts as does general drafting. ★

What about automation?

Training the Electronic Technician

By Harry R. Wilson

Adult Education Center
Lansing, Michigan, Public Schools



Drilling, tapping, chamfering, boring, and facing operations are all performed on one workpiece by this automatic machine. The work formerly was done by 20 or more semiskilled machinists on individual machines. Notice the one operator at the control panel wearing earphones and speaking into a microphone.

WITHIN the last few years a new word has entered both our technical and common language, the word "automation." Definition has succeeded definition, but as yet none has reached the official standard dictionary. A most fitting one might be "A modern engineer's word for the state of being automatic. The accomplishment of a work task by an integrated power-driven mechanism entirely without the direct application of human energy, skill, intelligence, or control."

Actually two different kinds of operations are referred to by this term. First, by using transfer mechanism and new automatic devices for handling materials, machinery has been integrated into an entirely automatic process. The machines adjust themselves to changes, correct their mistakes, inspect the product, and replace parts. On the other hand, when the electronic engineer or computer designer speaks of automatic he refers to "feedback" control and automatic regulation.

With the advent of this technological revolution the spotlight of industrial education has swung in the direction of a worker who is a product of this new age—the technician. Conceived by mass production, born of the assembly line, and nurtured by automation, he has risen to be a lusty giant. He is still growing, and nations are vying with each other in the numbers of his kind they can reproduce. In all countries the demand is far exceeding the supply.

The Technician's Place

Where does the technician fit into this modern world of automatized industry and business? It is generally conceded that we may divide our industrial manpower into five overlapping, but nevertheless distinct, groups. First comes the scientist, the high priest of automation. His theories and calculations, his formulas and abstractions, are taken by the engineer and made over into practical blueprint form. Blueprint, sketches, and information are passed on to the technician, who, together with the skilled mechanic, constructs, maintains, repairs, and improves the machines which produce, with or without the aid of the rapidly dwindling production worker, the goods and services so necessary in maintaining our high standard of living today.

We live in an age of change. Old skills are vanishing; new ones are taking their places. The automechanic has replaced the blacksmith, and the electronic technician is taking over slowly but surely the work of the automechanic as electronic ignition and atomic power, radios, and "autronic eyes" invade the automotive field. Automation has not yet entered the classroom, nor to any great extent has mass production but, when we read about colleges giving credits to hundreds of people who have received their courses by television, we may pause and think about this implication.

This changing industrial scene has made itself felt in our trade and industrial courses. Emphasis is moving from skills to related knowledge. It takes much studying, reading, and more reading to keep up with the new developments which are leading us deeper and deeper into the Automatic Age. Despite the efforts of the technical writer and the engineer-designer to simplify the task of maintaining the new machinery, our student-technicians will not keep abreast of the times unless they are taught to read, study, think, and apply this new knowledge. Every day we see more of this progress. In the field of communications, color is entering TV, transistors are replacing vacuum tubes, and entirely new techniques must be learned with the change from wire to printed circuits.

What Are "Fundamentals"?

Industry has repeatedly asserted, when asked for advice concerning the preindustrial training of their future technical employes, that they will accept students with a "good grounding in the *fundamentals*." But in trying to define this oft-repeated word, we find that the one given by the educator and that offered by the employment manager or personnel director differ widely. "Fundamentals" to the educator usually mean "reading, 'riting, and 'rithmetic." To industry, quoting from a booklet issued by a firm seeking electronic technician prospects among the graduates of the technical high schools, the following are "fundamentals":

"Knowledge of electricity and electronics is extremely useful, as are courses in such subjects as mathematics (basic algebra and trigonometry), machine-shop practice, fundamentals of machine design (mechanical and electrical), and basic electronic theory and use of applicable measuring instruments."

A recent graduate of a technical course who was a "whiz" with hacksaw, pliers, and other tools of his trade, was rejected when he applied for entrance into an electrical apprenticeship because of his lack of related English and related science.

Emphasis on related knowledge has moved into the factory due to the onrush

(*Continued on page* 25)

Here's an interesting project for the general-metals or general-shop class

Aluminum Fireplace Set

By Kenneth G. Wise

Associate Professor of Industrial Arts, Fairmont State College, West Virginia

THE cast aluminum fireplace set shown in the photograph and drawings on this page has been well tested. The project was completed several years ago and has now been given several years of usage.

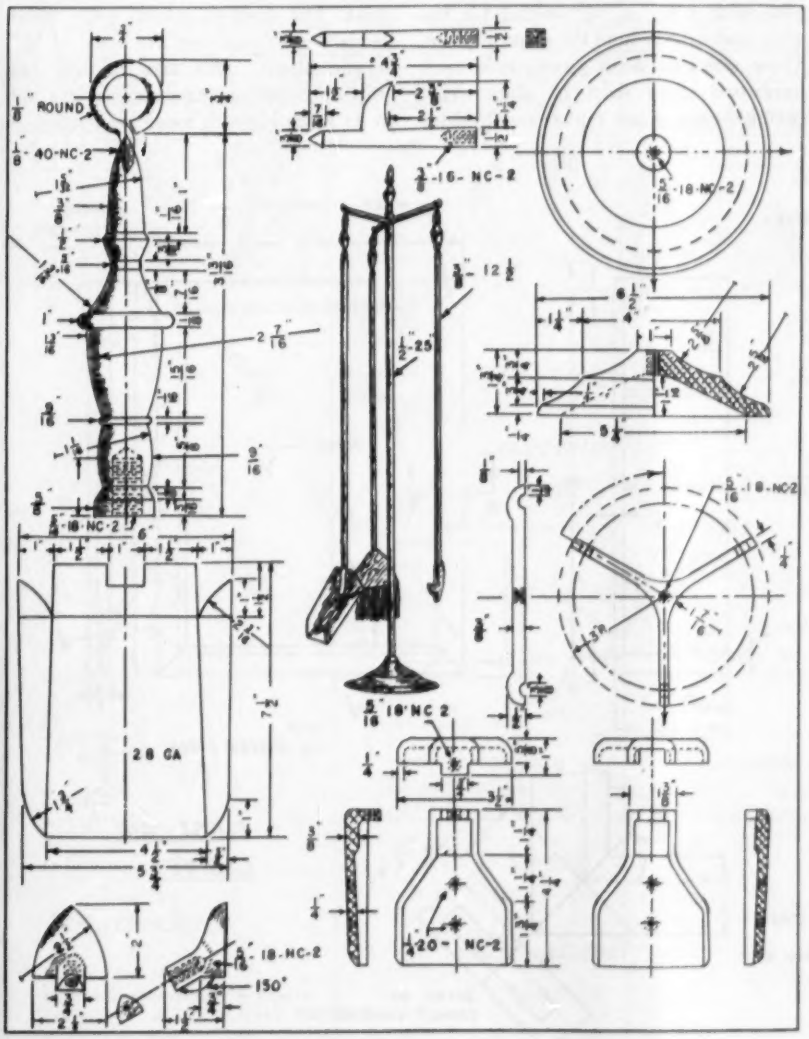
This set lends itself well to a general-metals class or a general shop having sufficient areas and ample tools to complete the project.

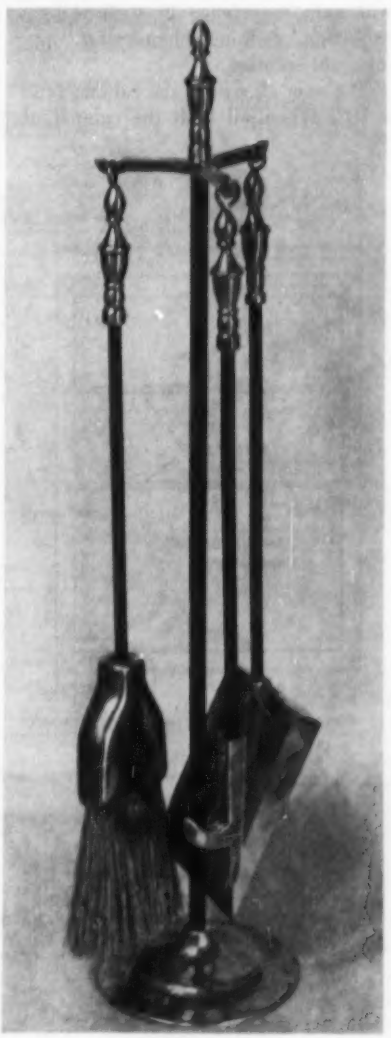
Proper drawings and layouts may be made in the drawing room area. The woodworking department gets a workout in woodturning, bandsawing, routing, rasping, filing, chiseling, and sanding. There are only six wood patterns to make, since all handles are identical. The foundry area will find most of these patterns easy to pull from the sand. It is advisable to use a shrink bulb when casing the handles as shrinkage will cause flat spots or imperfections in the handles. Be careful not to overheat the metal or have the sand too wet, which will cause the castings to be too porous to produce a lustrous polish.

The handles may be machined on an engine lathe or a woodturning lathe properly chucked and using carbide-tipped tools. The other castings may be worked down with an aluminum file or a flat vixen file, to be followed with fine emery cloth and oil and then buffed on a muslin wheel using tripoli and then rouge. All drilling and tapping should precede buffing.

The fireplace broom is completed by using a whisk broom which has been chosen to fit the aluminum castings that hold it in place. The handle of the whisk broom will probably have to be cut off to a length commensurate to the castings.

The finished project is a handsome, functional set, decorative to any hearth.★





For cabinet-making practice have your students build this

First Aid Cabinet for the Shop

By J. James Hasenau

Chadsey High School, Detroit, Michigan

A FIRST aid cabinet offers an opportunity for functional cabinet-making practice in the school woodworking shops. The cabinet shown here, which was designed and built in our wood shop, has a large bottom shelf to hold pint bottles of fluids such as alcohol, witch hazel, etc., as well as large rolls of bandages. Its acrylic plastic shelves leave all corners well lighted and permits one to look through shelves for items. The glass or acrylic plastic front provides instant inventory of the dust-free interior.

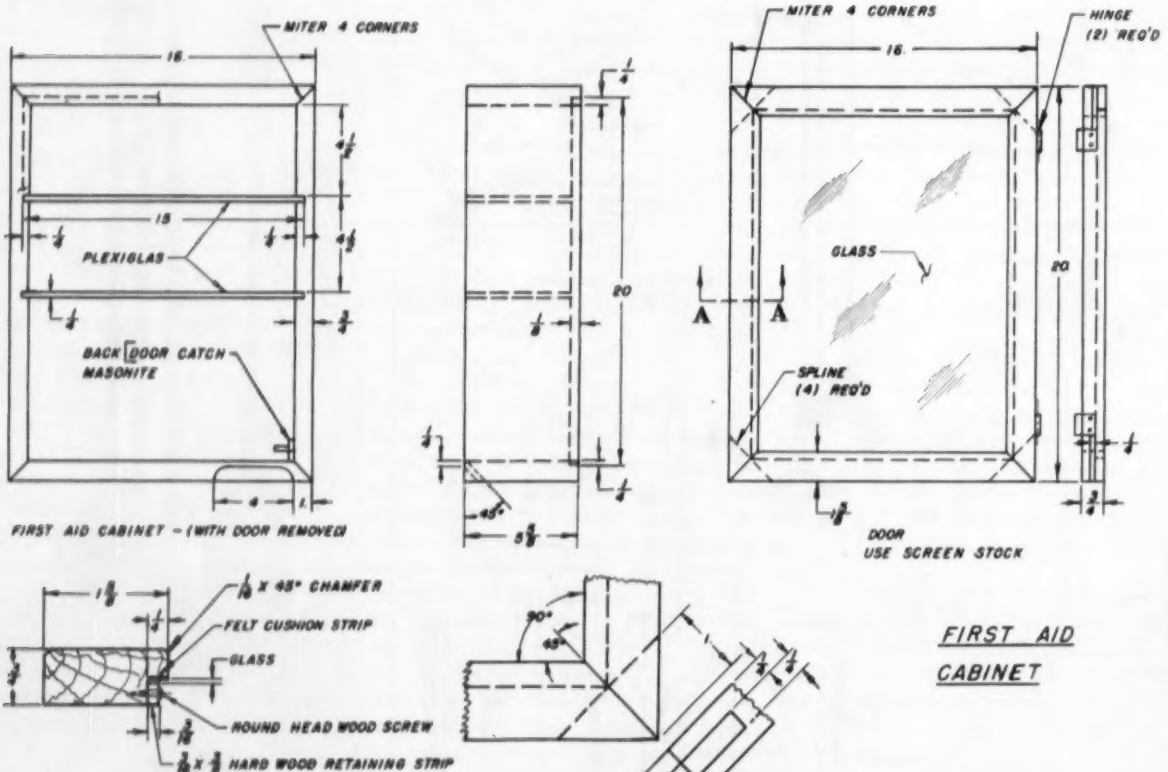
The student in building this cabinet will gain experience in such skills as rabbeting, dadoing, chamfering, mitering, and splining.

The over-all size of the cabinet is 12" x 18". When we built the cabinet, the 1" x 6" clear white pine frame with mitered, nailed 6D, and glued corners was first constructed. The slots for shelves were cut in before assembly. (Several extra slots may be used to make the shelves adjustable.) A 1/8" piece of tempered masonite was rabbeted into the back. Glue and 3/4" brads were used to secure it in place. This must be strong, for in fastening the cabinet to the wall, the back is simply screwed to the wall and it must support all the weight, which could be considerable in a cabinet this size.

The door was made of 1 x 2 clear pine with a 1/4" x 3/8" rabbet for the glass and strip to hold the glass in place. Three small flat-head screws hold each hardwood glass strip in place. This permits easy glass replacement. Miter joints reinforced with 1/4" splines hold the door together.

A light spring catch was used on the door to hold it shut. The spring is adjusted so slightly that a pull anywhere on the door frame will open the door. A chamfer along the cabinet bottom to be used for opening the door eliminates the necessity of a knob on the door.

In painting the cabinet we followed the hospital and first-aid pattern of all-white with red letters and the red cross. The shelves, which were fitted in place after painting, are made of 1/4" acrylic plastic. This material will not chip or break as glass shelves are apt to do when hit with medicine bottles. ★



Fishermen will like this

Fly-Tying Vise

By Herbert W. Yankee

Stratford, Connecticut, High School

AVID fishermen will enjoy this shop-made fly-tying vise which can be made with a minimum of power tools. Made so it will swivel to any angle and yet hold a hook securely, the vise requires only 10 to 15 hours of work for the 11th- or 12th-grade pupils and makes an excellent fill-in project at the end of the semester.

The list of materials calls for steel in the construction of the vise but brass or aluminum can be substituted and they are easier to work.

If the stud (#2) and the pad (#7) are assembled to the frame before it is bent to shape, the pieces may be peened together without interference from the bends on the frame. The knob (#1) can then be pinned to the stud.

The knob and stud can be made of one piece but it is less expensive to make them separately and pin them together.

The frame can be cold bent in a vise or forming tool but a template should be made so that the bends and angles will conform to the desired shape.

The lower jaw (#6) is sawed from a single piece of metal and then filed or milled to shape with a similar procedure used for the fan on the end. Note the holes in the fan which are not drilled through but only to the full diameter of the drill. This forms a socket to fit the cone-point set screw which regulates the angle of the jaws. The 5/16" radii on the jaws are cut with the jaws mounted in the faceplate of the lathe. The depth of this cut must be carefully held.

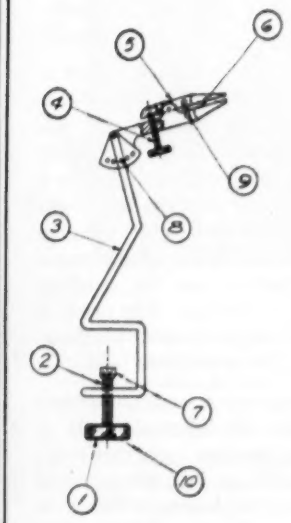
The adjusting screw (#4), the pad (#7), the stud (#2), and the knob (#1) are all relatively simple jobs requiring no special lathe set-ups.

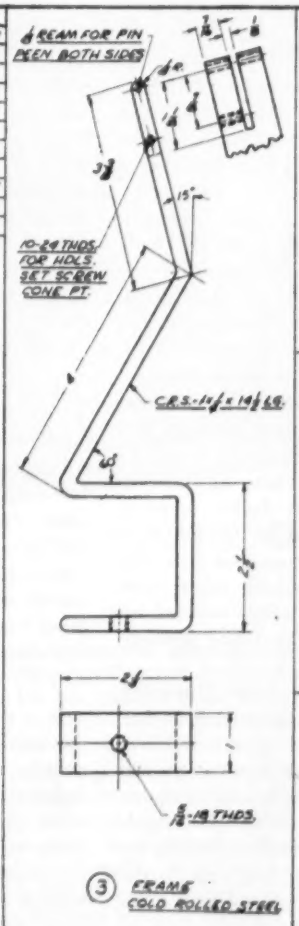
The spring selected for the jaws should be of suitable tension so the jaws will release when the adjusting screw is backed off. It should seat snugly in the holes drilled for it on the inside of the jaws. The spring can never escape from its position if it is the right size because the jaws will not open wide enough.

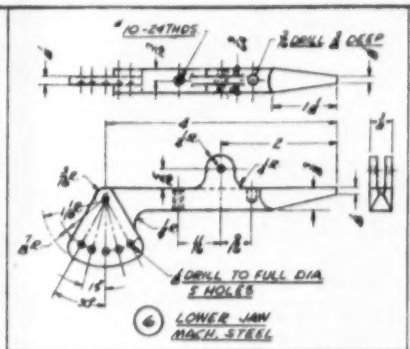
All sharp corners should be removed before assembling the parts. If made of brass or aluminum, the parts should be polished. If made of steel, they may be enameled an appropriate color. ★

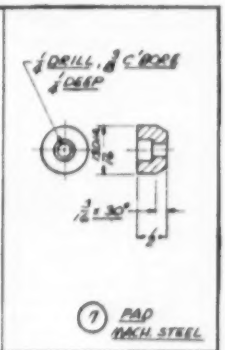
BILL OF MATERIALS

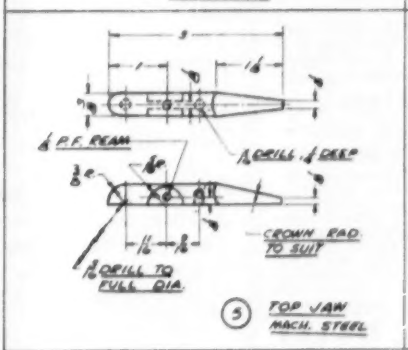
DET. NO.	NO.	NAME	MAT.	DESCRIPTION
1	1	KNOB	M.S.	1 DIA. × 3/4 LG
2	1	STUD	M.S.	3/4 DIA. × 2 1/2 LG
3	V	FRAME	C.R.S.	1/4 × 1 1/4 LG.
4	1	ADJ. SCR.	M.S.	3/4 DIA × 1 1/8 LG
5	1	TOP JAW	M.S.	3/4 SQ. × 3 1/4 LG.
6	1	LOW JAW	M.S.	3/4 × 2 1/2 × 5 LG.
7	1	PAD	M.S.	3/4 DIA. × 1/4 LG.
8	1	ADJ. SET SCR.	STD.	10-24 THDS. 1/4 LG
9	1	SPRING	STD.	1/4 DIA. × 1 LG
10	1	PIN	D.R.	1/8 DIA × 1/2 LG.

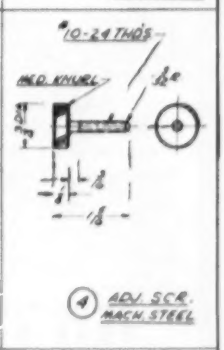


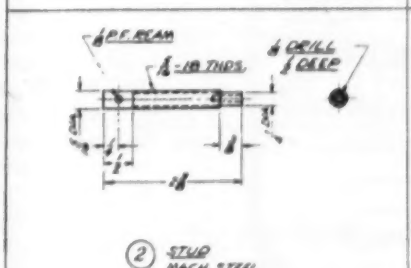


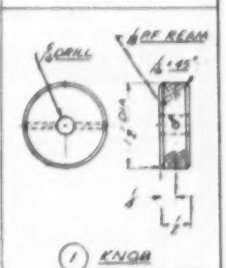












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Project Design

What the industrial designers are doing (One of a series)

DINING TABLE AND CHAIRS

Designer: GEORGE NELSON
Manufacturer: HERMAN MILLER FURNITURE ZEELAND, MICHIGAN

SHOP teachers who are attempting to follow the development of today's design will find these tables and chairs expressing with a good deal of clarity the basic concepts which guide the contemporary designer. The formfitting chairs indicate the designer's concern for comfortable support for the body while in both the tables and chairs an attempt has been made to capitalize on the natural beauty of the materials.

Two more new trends that are discernible: the use of metal in the pedestals of the table; and the two different woods used in the chairs.

The older tradition dictated the use of wood for dining room furniture in one form or another. Today, wood is still enjoyed and used for functional as well as aesthetic reasons, but it is also used in combination with other materials which are also wisely selected because of their functional and aesthetic qualities.

In the case of the table illustrated, rather than have a leg at each corner, which can be frustrating, just two legs were planned. This obviously is no new thought in supporting a horizontal surface. The combination of a well-designed cast-iron base and wood or Micarta top does, however, add a new note to this matter of furniture for the dining room.

Within the circle of the reader's acquaintances there are, without a doubt, individuals who would say that such a mixture is real crazy in the old sense of the term. On the other hand, it would be interesting to see their solution to the problem of making two legs out of wood of one kind or another. Would it have the necessary weight in the base? Would it be as sound structurally as this Herman Miller piece? Would it have the pleasing appearance (to most people, that is) of this table or would the legs appear cumbersome and bulky when adequate strength was obtained?

As to the second trend noted—that of mixing two varieties of wood—it is hoped that publicity given to this new development will not have an adverse effect on industrial-education design as a whole. That is, some shop teachers might find here some justification for digging out old plans in which walnut and maple boards are glued up and the resulting block turned on the lathe. The result is not necessarily a prize-winning combination, by today's standards at least.

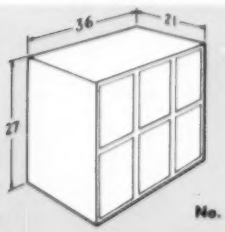
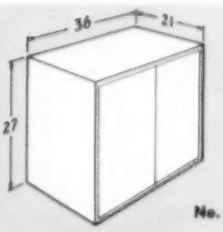
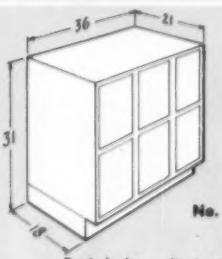
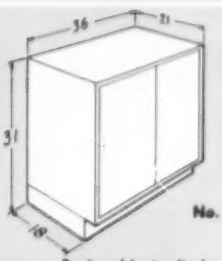
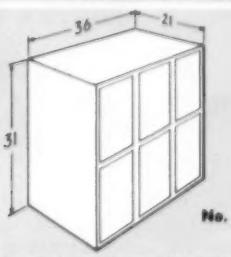
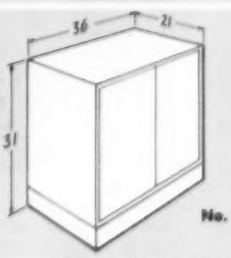
It is true there is a tendency toward the combination of different woods. A discriminating designer such as George Nelson can add an interesting visual effect in doing so, however. But it is likely an amateur designer can simplify his problem a great deal by restricting himself to one wood.—*Robert A. Tinkham, Assistant Professor of Industrial Education, University of Illinois, Urbana.* ★

A coordinated line of multi-use units that offer flexibility and grow-ability

H&S Shop Bench Units

Howard and Smith, Inc.
BENCH TOPS
of any size, in genuine TOLCO quality
BASIC UNITS
all-steel lockers or cabinets in two colors
BENCH RISERS
to make up toe-recessed or flush-front assemblies

Typical wall bench, using the new H&S toe-recess locker (No. 6T).

LOCKER TYPE	CABINET TYPE
 No. 6E — Basic locker unit for elementary and junior high use, 27" high	 No. 2E — Basic cabinet unit for elementary and junior high use, 27" high
 No. 6T — Basic locker unit plus toe-recessed riser, 31" high	 No. 2T — Basic cabinet unit plus toe-recessed riser, 31" high.
 No. 6 — Higher locker unit, roomier lockers 31" high, for High School and College	 No. 2 — Basic cabinet unit plus flush-front riser, 31" high

The basic locker and cabinet units are of identical overall dimensions, to allow their combination in forming various assemblies. While the basic locker units contain six lockers, they can be unbolted to form three smaller two-locker units, thus increasing their flexibility.

The basic units plus 2¼" thick tops form ideal working heights for elementary and junior high school students. Older (and taller) students are accommodated by the addition of a 4" riser. This may be of the flush-front type where tops extend out sufficiently, or of the toe-recessed type where they do not. This toe-recessed riser, unique with H & S units, prevents needless damage to locker and cabinet doors and provides a more comfortable working position for the student.

Genuine TOLCO bench tops are supplied in any width, length, or thickness that is required. TOLCO tops are constructed of ¾" wide full length strips of northern hard maple. They are electronically glued and strengthened by concealed steel tie rods. Lacquered, galvanized steel, or acid resistant surfaces may be had.

See other side for typical H&S shop benches

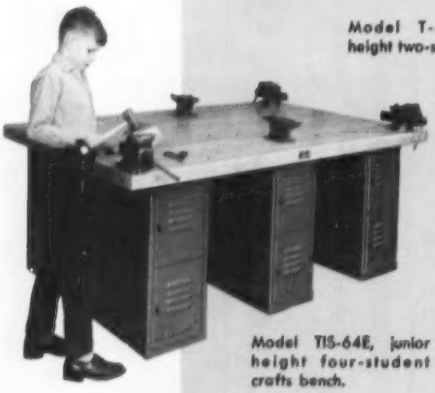
Shop, Laboratory, and Art Benches

These standard assemblies all utilize H&S Shop Bench Units, Tops, and Risers. Single, two, four, or six student work benches, and island base and wall type assemblies may be made by using these same components. Many standard assemblies other than those shown here have been worked out and are sold as complete units. However, the flexibility of the basic units permit an infinite number of variations.

Model T-64, senior height four-student bench.

Model T-62E, junior height two-student bench.

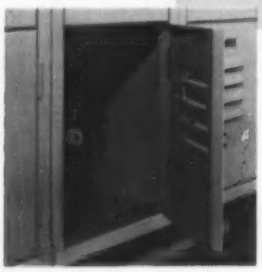
Model T-21T, senior height one-student bench.



Model TIS-64E, junior height four-student crafts bench.

Model TWC-10T, wall bench using toe-recess lockers (No. 6T) and toe-recess cabinet (No. 2T).

Quality Features Found on All H&S Shop Bench Units



LOCKER TYPE

Locker doors are ventilated and provided with sturdy friction-closure padlock catches. They don't rebound when slammed shut. Heavy hinges withstand long hard use. Locker bottoms are flush with sills to allow easy sweeping out. Each 2-locker section is of welded heavy gauge steel, with baked enamel finish.

CABINET TYPE

A heavy gauge steel unit. Cabinet doors have a heavy satin chromed lock for safe storage of supplies. Cabinet shelves are fully adjustable, to suit your needs. Additional shelves may be added. Both cabinet and locker type units are available in two colors: Castillian Green or Light Cadet Grey.

Howard and Smith, inc.

WRITE TODAY for a complete illustrated price list, covering all the standard H & S work benches. Prices also given for the H & S work bench units, risers, and TOLCO tops so that you can plan the assembly of benches to suit your own needs.

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KINKS

Payment will be made for each Kink published. Send to Editor, School Shop, Ann Arbor, Mich.

Pad for Perfection

Many large projects such as cedar chests, chests of drawers, and desks are permanently marred by being scuffed or scratched when turned on the shop floor or bench. Here's how to avoid it:

Go to your furniture or floor-covering dealer and ask him for his rug or carpet trimmings. Anything 3" wide and about 3' long is fine. Secure one end of the carpet strip to a piece of 2 x 4, about 3' long with a piece of ¼ plywood and three or four celotex nails, stretch the strip over the 2 x 4 and secure the other end in the same manner. Turn your projects on a pair of these pads and your marring days are over.—*E. N. Pearson, Lehi, Utah, High School.*

Utilize Tobacco Tins

Paint brushes are a constant headache, and to clean them not only means using much solvent, but also a place for them to "soak." Save pocket-type pipe tobacco cans for this purpose. They will hold a brush nicely and will require only a small amount of solvent to cover the bristles at a time. Mount them in a wooden rack, and label various cans for the different solvents: alcohol for shellac, turps for varnish, etc.—*Don F. Kinnaman, Rocky River, Ohio, Junior High School.*

High and Dry

If you have trouble with those silk-screened posters sticking together or with printed posters offsetting, try hanging them up to dry like clothes on a line.

Buy as many snap clothespins as you think you'll need and drill small holes through each half of the top. Thread these clothespins on a piece of stovepipe wire long enough to reach across the room. Fasten the wire to a convenient pipe or to toggle bolts placed in the wall and you have a handy overhead drying rack.—*Irvin Lathrop, Iowa State College, Ames.*

Air-Tight Sealing

Methylene dichloride acid for cementing plastics evaporates very fast when it is exposed to air. In order to keep this acid as long as possible, even through the summer vacation months, I place a strip of adhesive tape around the lid on the jar to help form a seal. —*Bob Geister, Walnut Junior High School, Grand Island, Nebraska.*

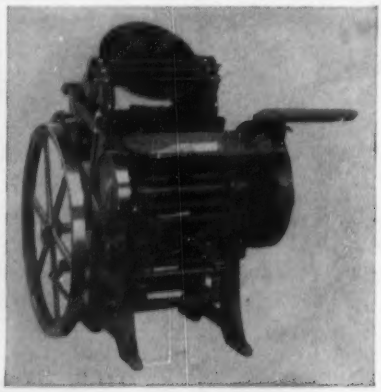
Strop for Sharpness

The cutting edge of plane blades, wood chisels, wood-turning and carving tools can be improved after the initial whetting if you strop them on a piece of leather. To make the procedure practical, the strop must be placed in a handy location within arm's length for ready use.

To make sure that the strop remains near the work station, hook it to a dog-

(*Continued on page* 21.)

C & P NEW SERIES PRESSES These presses in sizes of 8x12, 10x15, 12x18 and 14½x22, provide the student with equipment that furnishes all practical requirements of hand fed press operation. May be equipped with flywheel, belt and platen guards. Also furnished for treadle operation instead of motor drive.



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C & P BENCH CUTTER An efficient, small size cutter that handles sheets up to 19"x24". Equipped with two-handed safety control.

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"HANDBOOK OF PLATEN PRESSWORK" *is one of the outstanding aids to printing furnished without charge to printing instructors. If you do not have a copy, just request one.*

C & P PILOT PRESS A thoroughly efficient little press, chase 6½x10, that teaches basic principles of press operation with exceptionally fine printing results.

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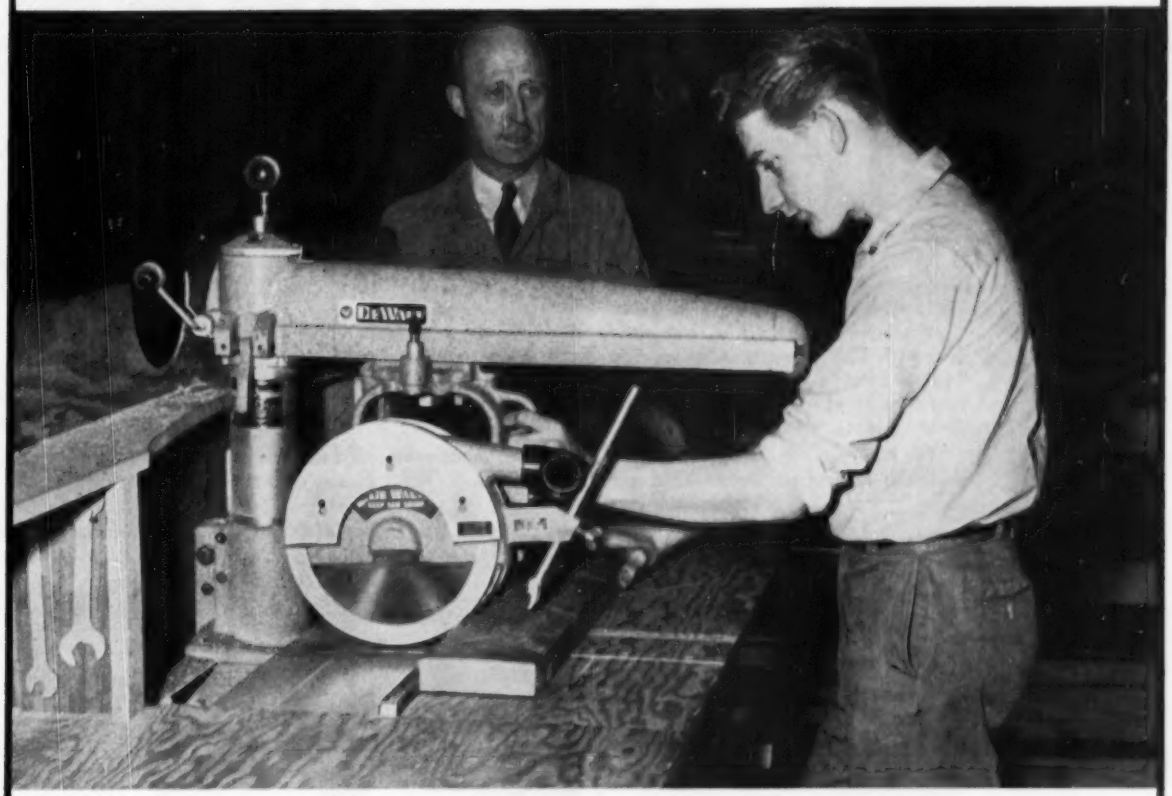

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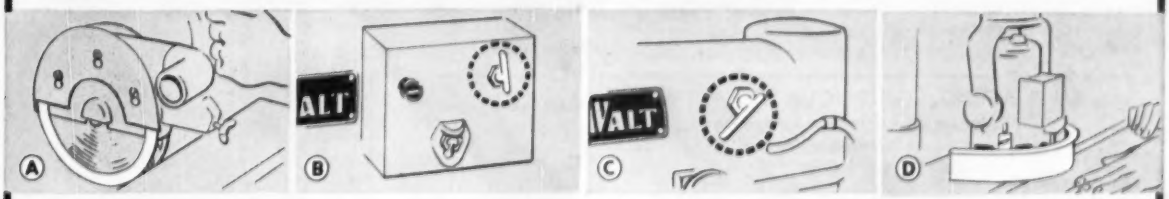

You need these exclusive operating safety features: **A**—Simpler, safer top-side cutting with exclusive safety guard. See your mark *and* your saw. **B**—Power brake stops saw in 4 seconds for *added* safety. **C**—Safety key switch prevents unauthorized use. **D**—De Walt becomes tilting arbor shaper with exclusive shaper guard—gives 50% more shapes per cutter. Combines 12 basic power tools. Builds into workbench, gives safer straight-line handling.

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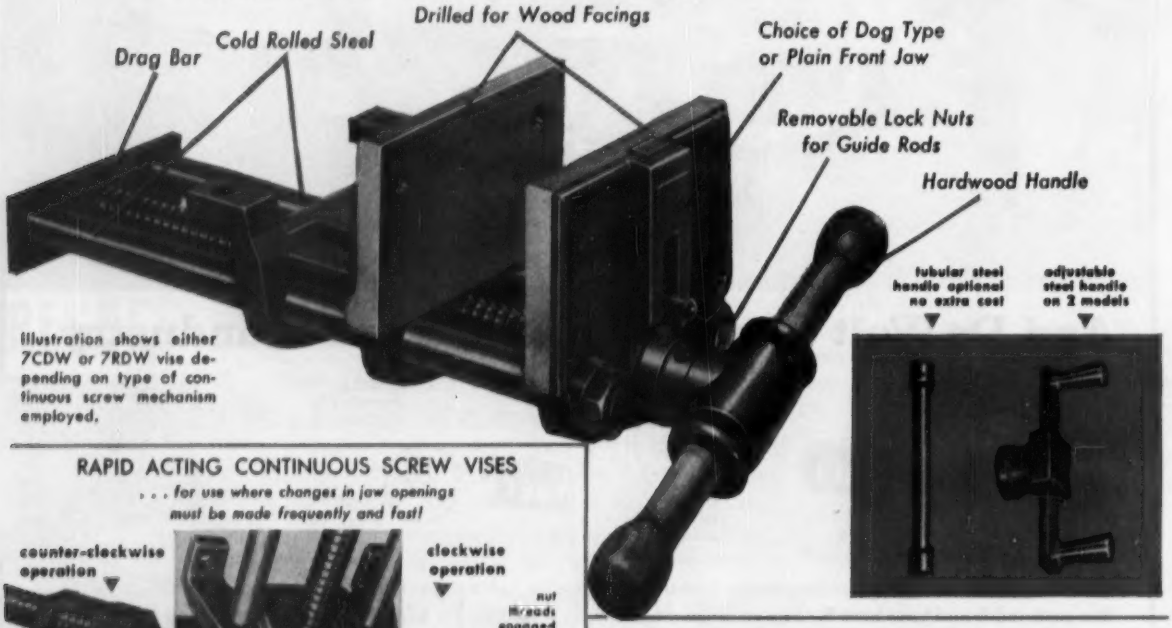
For example, No. 7CDW specifies 4 x 7" jaws, 9" opening, solid nut mechanism, dog type front jaw, seasoned hardwood handle—old catalog No. 5CD.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Removable Lock Nuts for Guide Rods
Hardwood Handle
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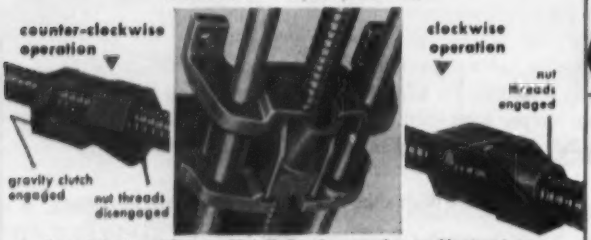
Illustration shows either 7CDW or 7RDW vise depending on type of continuous screw mechanism employed.

RAPID ACTING CONTINUOUS SCREW VISES

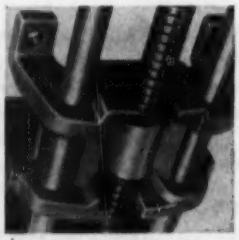
. . . for use where changes in jaw openings must be made frequently and fast!



Rapid Acting "Power-Slide" Continuous Screw Mechanism

Key to superior operation is exclusive "Power-Slide" mechanism. This incorporates a gravity friction clutch which assures positive operation (no springs) and automatically compensates for wear. Counter-clockwise operation of screw disengages mechanism, facilitating "free sliding" adjustment of jaw opening. Clockwise operation of screw engages full 180° half-nut, producing continuous inward jaw movement and high pressure holding without slippage.

SOLID NUT CONTINUOUS SCREW VISES



▲ **Solid Nut Continuous Screw Mechanism**

. . . for general woodworking in industrial and school shops!

Heavy steel screw is made with double lead, fast running thread to provide maximum speed of operation. Solid Nut assures long, repair-free life.

2 models of Solid Nut Continuous Screw Vises are made with special Adjustable Steel Handles for extra fast operation.

COLUMBIAN Vises

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CLEVELAND 4, OHIO

leash chain which has been attached to the oilstone stand, machine bed, or woodcarving bench. The strop can be easily made by gluing a strip of cowhide to a thin piece of hardwood. Get the leather from a piece of discarded belting, oak-tanned cowhide from the local leather store, razor strop from the second-hand shop, or from the shoemaker around the corner.—*Charles M. Rice, Western Washington College of Education, Bellingham, Wash.*

Salvage for Measurement

When my steel rules become battered and bent, instead of throwing them away I cut them into 1" lengths and use them for very small measurements. Being just 1" in width, the rules then become 1" square with gradations for 1/64" to ⅛", easily carried in the instructor's pocket.—*Nathan J. Gould, Albert Bushnell Hart Junior High School, Cleveland, Ohio.*

Picture the Piece

To help students become acquainted with the various tools and equipment they'll be using during their classes in graphic arts, I give each of them a "Tool and Equipment Identification Sheet."

To make the sheet, go through the various printers' supply books, clipping pictures that apply. Paste them on a large sheet of paper, set a line of type and pull a proof of it for the heading, then have a Multilith 8½ x 11 plate made so the sheet can be reproduced.

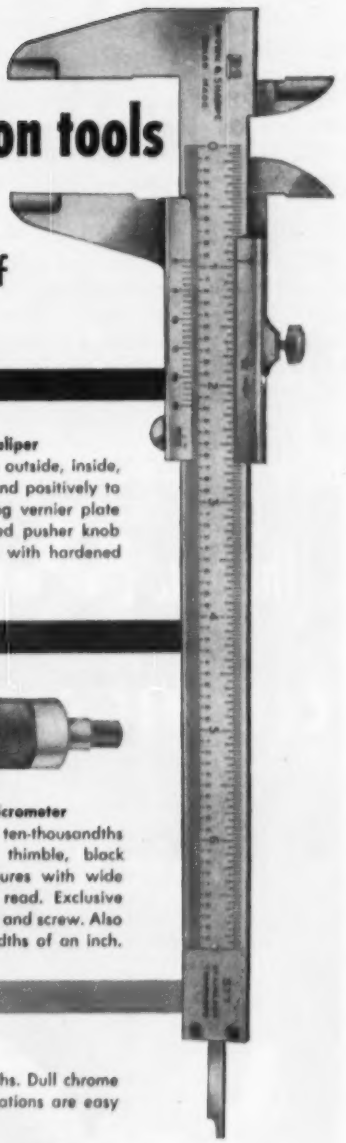
I first use the sheet to introduce the student to the names and proper spelling of the items pictured and follow up with a test. Twenty-five different pieces of tools and equipment can be placed on the sheet if you are patient in finding pictures that are small enough. I use pictures of equipment that we use everyday such as: ink brayer, ink knife, paper cutter, slug cutter, line gauge, platen press, type stick, etc.—*Fred Sherwyn, Centennial Senior High School, Compton, Calif.*

Patterns for Teaching

In teaching the use of the framing square for cutting a common rafter, I like to give each student a problem to figure and so he can lay out the necessary cuts. This can use up a lot of expensive lumber if you allow each student to take a separate 2 x 4 or 2 x 6 and very often we don't have enough lumber for this.

Therefore, I ask two of the boys to cut some 4" or 6" strips of butcher or

3 new precision tools that take the "task" out of precision



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wrapping paper, making the strips 12′ or 14′ long. Each boy is then given a strip of this paper and a couple of thumb tacks to attach it at both ends of a piece of lumber. They can then draw their center lines, lay out their rafter cuts, and have them checked for accuracy, write their names on the paper strip, and hand it in. If they make a mistake they can turn the paper over and try again. With a pair of shears they can cut out the rafter and with another student's help actually hold the strip up in its true position just as if it were a full piece of lumber.—*L. D. Jenks, Clovis, Calif., Union High School.*

Good Lumber in Good Supply

Here is a hint on getting some good lumber for spindle turning. Our local bowling alley was discarding a large number of old, beat-up, used bowling pins. We sent the school truck to pick up a large number of these pins and got nearly 200 of them. They are now being used for practice turnings, bowling-pin lamps, mallets, gavels, etc. The boys are quite fascinated by working with this type of material. It takes a nice polish.—*Harold S. Preston, Lawrence Junior High School, Lawrence, Kan.*

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The Essence . . . *from page 8*

and that function is to be accomplished through industrial arts, how can it be accomplished except in those courses which are *required* of every student? At present, industrial arts, as a required course, is found in few schools in the nation in any grades except grades seven and eight. And even in those grades industrial arts is seldom required for girls.

110 Required Hours

A curriculum for grades seven and eight for a new junior-high school has been developed by curriculum experts from one of the most progressive schools of education, a division of a large state university, in cooperation with the local school personnel. In this curriculum, industrial arts is to be required of all boys and girls in grades seven and eight. The students will spend 12 weeks in each of those two years in industrial arts. The remaining 24 weeks will be equally divided between fine arts and home economics.

The total amount of time which every student, in this particular school system, will spend in industrial arts is 110 hours, which is equivalent to a one and one-third regular one-hour, one-semester course. Fifteen percent of that time for related study would be equivalent to 16½ hours or approximately three weeks of a one-hour course. How many discussion lessons about the general organization of industry, industrial occupations, the uses and limitations of industrial materials, the problems of labor and management, may be held? How many reports on readings on industries and industrial products may be given? How many motion pictures illustrating industrial processes, methods, raw materials, occupations, and new developments may be shown? How many visits to industry may be made in 16½ hours?

It should be emphasized at this point that reference has been made only to one objective of the eight which Wilber and Newkirk propose, and ten and thirteen set forth respectively in Ericson's and Gruhn and Douglass' books. To accomplish all of these objectives, in addition to the one which has just been discussed at length, the 16½ hours of related study would have to include, also, discussion of hobbies and their value, principles of design and craftsmanship, trips to museums, discussions of good construction in furniture, of proper maintenance of common shop and home tools and equipment, desirable social relationships, etc.

On the schedule referred to, with 16½ hours for related study, 93½ hours would be available for manipulative work or work related to making a project. To consider again the objective of exploring and understanding industry, its raw materials, and processes and operations, how many different industries, of those referred to in the *Standard Industrial Classification Manual*, their raw materials, and processes and operations could be explored and what understandings developed through manipulative activities in that length of time?

Industry Is Complex, Time Is Short

The answer would hinge largely on the number of projects which the student could complete and the number and variety of raw materials, processes and operations used in the construction of those projects. In a general shop with areas in woods, metals, graphic arts, crafts, electricity and communication, and transportation, the student would have 15 plus hours, or approximately three weeks, in each area. In that length of time the average student would do well to complete more than two or three of the simplest projects in each area.

In referring to the 16½ hour and 93½ hour division, it should be pointed out that no allowance has been made for starting and stopping the class, for shortened class periods for any reason, for absence of individual students, etc.

Attention should also be called to the fact, in connection with this objective, that, at the junior-high level, industrial-arts shop activities are often predominantly hand work, hardly representative of many modern industrial processes or operations.

Are We Seeking Too Much?

To conclude then, this discussion has been concerned with the need for a clear, meaningful, unequivocal basis on which to promote the cause of industrial arts and with the assumption that industrial arts has taken as its primary objective and justification for being that it should provide *every* student a *comprehensive study of industry* in terms of its organization, occupations, new materials, processes and operations, and influence on our modern social and economic life. In light of the foregoing discussion, this question is seriously and sincerely raised. Is this objective the most valid one, particularly in terms of its possibilities of achievement, as the primary basis on which to rest the case of industrial arts as an integral and essential part of the curriculum? ★

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An easy way to construct

Adaptable Shelving

By James Cook

Bangor Public Schools, Bangor, Michigan

MANY industrial-arts shops suffer from a common and chronic complaint—lack of adequate shelving space for storage of shop supplies.

Functionally-designed storage units will eliminate much of the cramping and confusion resulting from inadequate storage facilities. The adaptable shelving described and sketched in this article is not only functional, it is also inexpensive and easy to construct.

Adaptable shelving may be quickly arranged and rearranged to accommodate objects of varying shapes and sizes. Shelving that encourages adaptation for differing heights eliminates the wasteful practice of storing objects only 6" tall on a shelf designed for 10" or 12" items. Saving 4" to 6" of room on each shelf can easily result in space for one or two additional shelves.

Ordinary 1" pine or other shop wood, ⅜" birch dowels, and wood screws are the only materials needed for this adaptable shelving.

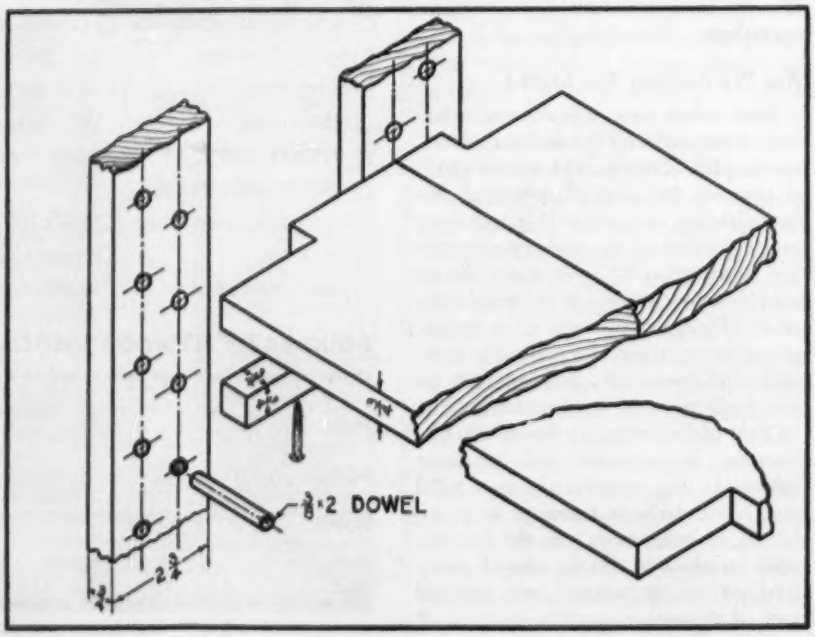
First to be constructed are the stiles which support the shelving. Select 1" stock of any convenient width, 2¾" width being suggested for economical cutting from wider boards. Rip all stiles to a uniform width. Plane or joint the edges. Cut the stiles to length. (The length is variable and depends on the space available.) Use a marking gage to lay out the two center lines for the staggered dowel holes. Staggered holes are used to secure small adjustments in height and still maintain the strength of the stiles. Lay out the intersecting center lines spaced 2" on centers. Drill the ⅜" dowel holes.

Next, the shelves should be constructed. Use 1" material for shelving. Joint or plane all edges. Cut out the corners to fit around the stiles.

Rails are used to join the shelf boards and to support the shelf on the dowel pins. The thickness and width of the rails may be varied to make use of scrap stock. For adequate strength, a minimum of ¾" is suggested. Rip the rails to a uniform width and a uniform thickness. This procedure is simple but important if the shelves are to be level! The length of the rails must be equal to the width of the shelves.

Cut ⅜" dowel rods into 2" lengths, four pieces for each shelf.

Locate the rails on the underside of the shelves. Mark and drill holes for screws. Fasten the rails to the shelves. Then fasten the stiles into position in the available space. Insert dowels into the proper holes, several taps with a rubber mallet being suggested as an excellent method of insertion. Move the shelf into place. The set of adaptable shelving is now ready for use. ★



of automation. Tool designers, electricians, production and process engineers, all are returning to school in evening courses to obtain knowledge of basic electronics, practical hydraulics, and pneumatics. They are all wanting to know "what makes these new machines tick." Our training in industrial education is moving from the "know how" to the "know why" with the greater emphasis on the latter.

The following abilities and skills seem to be basic in the training of an electronic technician:

1. The ability to follow written directions with accuracy and good judgment.

2. The ability to read and interpret the technical language of his trade.

3. The ability to draw and interpret circuit diagrams, blueprints, and graphs used in his work.

4. The ability to use correctly, and interpret the findings of, measuring instruments and meters.

5. The ability to use logical procedure when troubleshooting electric and electronic apparatus.

6. Skill in the use of a soldering gun and small tools, including pliers, screwdriver, hammer, wirestripper, metal and wire cutters, etc. Although the technician may seldom have to use small power tools such as a portable drill and bench lathe, some training in these tools should also be obtained.

The emphasis for the training of the electronic technician is placed more on laboratory techniques than shop techniques. The work is of a delicate and precise nature. High level in dexterity when using small tools is called for. Much hand work is done under magnifying lenses. These magnifying lenses are also used in detecting faults in crowded circuits and in reading small print.

The electronic technician should be clean, orderly, and a good housekeeper. Although the trend is not yet very evident there are indications that girls are entering this field in increasing numbers.

For those of us in trade and industrial education, the challenge of these changes in industry and business should be clear. We should welcome the expanding opportunities for employment of our graduates and make sure that our students are prepared to take advantage of them by revision of our courses, by more cooperation between industry and our classes, by constant study of the changing situation, and by taking every opportunity of obtaining experience in industry ourselves for use in our classroom and shop work. ★

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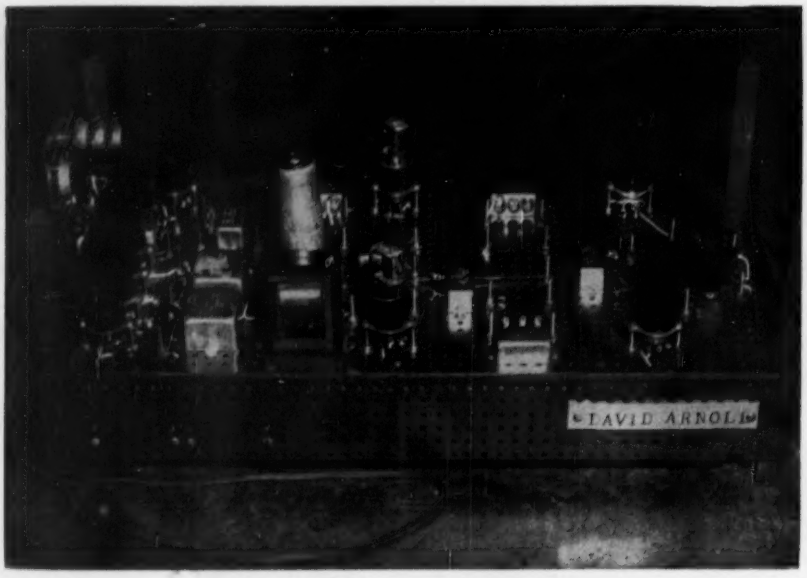

Circuit changes are easy with this chassis. Note posts for support when the chassis is inverted.

Pegboard Radio Chassis

By Forest Lynn

Bakersfield College, Bakersfield, California

A BOARD on which students may experiment with many radio circuits, making frequent changes and tests, is very desirable and often used in radio and electricity classes. The so-called "breadboard" chassis is one variety while metal chassis are often used. The latter contains many holes for tube sockets and other components so that a wide variety of combinations is possible.

Seeking more flexibility in a board arrangement so that unsoldering and unsightly holes could be avoided, we struck on the use of masonite pegboard, which works out admirably. The pegboard we use has holes ½" apart which allows for the mounting of parts without boring new holes.

Wiring can be run either above or below the board. Each resistor, condenser, choke, and transformer is provided with a pair of machine bolts so that a quick change may be easily made. Very short war-surplus machine screws are used to connect the parts. Sockets are mounted well above the chassis with 1½" machine screws for easy access to the base.

The four long legs at the corners of the chassis as shown in the photograph provide support when the chassis is turned over or on its side.

A metal plate is fastened to one end of the chassis to serve as a controls mounting. The plate came from a war-surplus tuning unit. There are five controls for the circuit shown in the picture: switch, volume, tone, high-value variable resistor, and a low-value variable resistor or potentiometer. The high value is for varying resistors such as plate, screen grid, or control grid to determine the effect on voltages and on the signal. This should be about one megohm. The other variable resistor should be about 5 or 10,000 ohms for varying cathode bias.

Circuits consist of an ac-dc voltage doubler power supply for power to a five-tube phase inversion amplifier. We have many 12A6 war-surplus tubes so these were used, two in parallel, as rectifier tubes and work very satisfactorily, even though they are power amplifier tubes.

A set of 40 mimeographed sheets has been made up for this layout alone, providing many tests and experiments with the circuit. When the student has finished them all, he has had experience with opens, shorts, leaky condensers, changed resistor values, and bad tubes.

Twenty-five of these chassis are used in day school and another 25 in the night program. After the set-up of a phase inversion amplifier is finished, the same apparatus will be slightly rearranged for a superheterodyne receiver. A similar board is used in electrical classes. ★

Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

First Things First

ONCE upon a time there lived in a remote part of the state two young run-of-the-mine teachers of industrial arts. As is customary with men of their ilk, they were seeking a few moments of relaxation in the boiler room of their school. As they tarried in this forum of public opinion they were discussing the current problems of teachers, as was their wont on such occasions.

Apparently the topic of immediate concern to them was a session they had attended on the previous evening. One of them said to the other, "What did you think of class session last night?" "Oh," said the other, "it was terrible. Why, oh, why, should we be afflicted by such malarky when we are constantly confronted by teaching problems for which we are seeking the answers."

It appears that the professor had spent two uninspiring hours relating, at great length, the exploits of Cygnaeus, Froebel, and Pestalozzi, when both teachers were eagerly anticipating help with their teaching.

Both of the men agreed that the desire of their superiors to upgrade them might be reasonable, but they found it difficult to understand why a college professor should conclude that the only means of achieving this was to unload on them the philosophies of men who had long since passed on to their reward.

The teachers were anxious to know how they should deal with a situation in which they were faced with 35 pupils and only 25 work stations. They had a desire to learn how they could improve their demonstrations. They had a live interest in the question of how to select their subject matter, and how to arrange it in a sequential teaching order. The lack of good discipline in their classes annoyed them, and they were anxious to hear of methods by which it could be improved. These and many similar problems were present in their minds which they hoped would come up for discussion in the class. But no, some erudite college man had decided that teachers must have a philosophy of education, and since he had recently exposed himself to such a course, he was impressed with its profundity, and he concluded that this was a good point at which to start the upgrading of shop teachers.

We have no fault to find with a course in the History and Philosophy of Education, but we are of the opinion that when such a course is used as an introduction to the training of shop teachers it is not apt to endear them to the upgrading process. It is true that all teachers should have a philosophy of education, and that they may be aided in formulating their philosophy by learning about the attitudes of the great educators of yesteryear. However, before we can develop an interest in such matters, it is important that we gain the confidence of the teachers by demonstrating that we can help them solve their immediate problems.

When this confidence has been built up, it may then be appropriate to introduce a discussion of topics which are less closely related to the immediate teaching task, but which may have a profound effect on the thinking of the teacher on the job.

And so we return to the boiler room and we find that the two teachers are not averse to attending a class, and they are eager to learn, but they would like to start with material with which they

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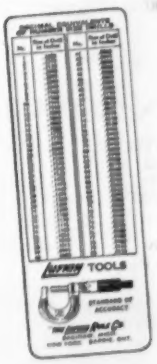

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have some familiarity. They want to begin with a topic on which they may be able to express an opinion, and then be led gradually to the more obscure phases of education concerning which they know relatively less.

We would hardly go so far as to claim that this type of teacher trainer is typical of the group as a whole, but he appears often enough to warrant comment. It is probable that this frequency results from the appointment of teacher trainers from a group of young men who have made a brilliant record in their patient struggle to earn their degrees. They lack the work experience of the artisan who has become a teacher, and they have had little or no experience or contact with the actual job of conducting a shop class. Notwithstanding these deficiencies they proceed to pose as experts on what a teacher needs, and wants, to help him in the various day-to-day tasks he performs.

Therefore, in our efforts to upgrade shop teachers, let us follow the suggestion made by our old friend Skipper Allen by starting them out on ground with which they are more or less familiar and leading them on gradually to the "jumping off place" where they launch out into the unknown. ★

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[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Dear Sirs:

The February issue of SCHOOL SHOP contains many interesting and informative articles. The chart on "How to Square Up a Board by Machinery," submitted by Mr. Turnbull, seems rather incomplete, however. In my opinion, Mr. Turnbull has omitted the first and most basic step in the squaring up of stock. That step is dressing one surface true and flat on the jointer. The thickness planer will not remove the cup or twist that is present, to some degree, in most boards . . . To true one surface as a reference for succeeding operations is basic not only to wood but to many different operations, regardless of whether it is done by hand or machine operations.

Possibly Mr. Turnbull is aware of the importance of the basic step which I suggest, but has become accustomed to using a small jointer which is limited principally to edge planing. I did not overlook the footnote which recommends that a warped board should be hand planed first. Actually, it is seldom that a board is absolutely true and also it is probably more feasable to expect a student to perform this operation with the proper machine rather than by hand.

John H. Erickson
Associate Professor of Industrial Education,
Southern Illinois University,
Carbondale, Illinois

(Editor's Note: Professor Erickson's comments were forwarded to Mr. Turnbull, who sent us the following reply.)

Dear Sirs:

I omitted the step Mr. Erickson referred to in his letter because I wanted to keep the squaring up process as simple and easy to follow as possible. I did not want to complicate the chart for just the occasional, exceptional board. I don't think many shop teachers would want to make jointing one surface first as a must on every board. If some teachers wish to have their pupils dress one surface true and flat on the jointer as the first step, they can add it as a preliminary step to the chart by class demonstration.

The newer schools do not have large jointers and many teachers would prefer to have the few boards that have twists and warps hand planed on one side rather than follow the hazardous method of surfacing one side on the jointer.

With the modern methods of kiln drying and processing, good grades of lumber can be kept relatively free from twists and warps if kept in the rough until used.

J. S. Turnbull

Dear Sirs:

Many thanks for the regular delivery of your splendid magazine. I have used a great deal of information from past issues of it in my daily classes. The diversified trade classes for apprentices are more than interested in the literature and advertising matter provided by your advertisers.

Please convey my regards to Mr. Tom Diamond for his philosophy, which I always enjoy, and "Lang may his lum reek."

James M. Macintyre
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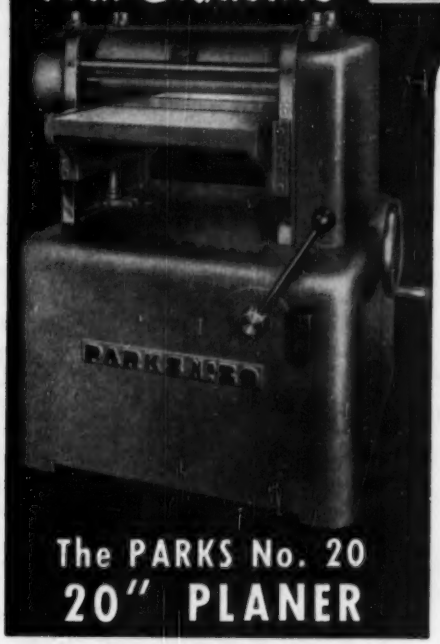

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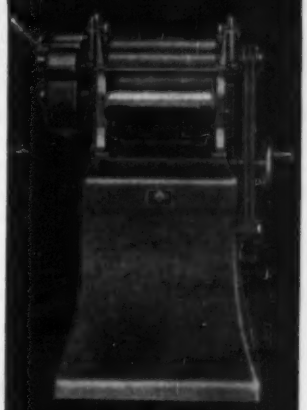

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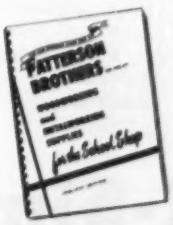

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happenings in industrial education

Dr. Sotzin Honored

THE 1956 citation for outstanding service to industrial education presented by The Ship at the California Industrial Education Association convention at Bakersfield in March was awarded to Heber Allen Sotzin. Dr. Sotzin, chairman of the industrial-arts department at San Jose State College, California, was honored for his many contributions to education, for his scholarship, creative teaching, professional standpoint, and sense of values.

The convention was preceded by the state's eighteenth annual conference on industrial education, March 13-16, in Bakersfield. More than 150 coordinators, supervisors, and teacher educators of industrial arts and T & I education attended the conference.

New Florida President

JAY BORDEN, Tampa, formerly vice-president of the Florida Industrial Arts Association, is now president. He assumed his new position in January when the association's executive board received the resignation of Floyd Taylor. Mr. Taylor has accepted administrative duties with the Dade County school system in Florida.

Education on Wheels

A NEW traveling program in extension training on a trade level has been initiated by the automotive wholesalers of Oklahoma in cooperation with Oklahoma A & M Tech, Okmulgee, and the Oklahoma State Board for Vocational Education. A series of automatic transmission schools, open to any tradesman who has two years of shop experience or the equivalent, will be conducted in 20 principal towns in the state.

Edgar Vassaur, veteran auto mechanic instructor, will conduct the classes with the aid of up-to-date instructional equipment to be transported in Oklahoma A & M Tech's extension service car.

This "education on wheels" program is the first of several planned by the school. Dry cleaning schools are planned as well as printing short courses for men in the industry. School director L. K. Covelle states that extension programs will be started as there is a demand from the industry. It is possible for the school to have an entire fleet of extension cars over the state conducting short courses in many of the 35 trades, according to Covelle.

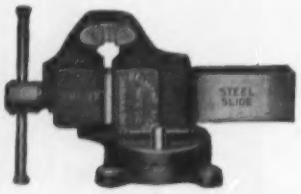
New Assn. Elects

DON KINNAMAN of Rocky River Junior High School, Ohio, has been elected president of the newly-organized North Central Industrial Education Association in the Cleveland, Ohio, area.

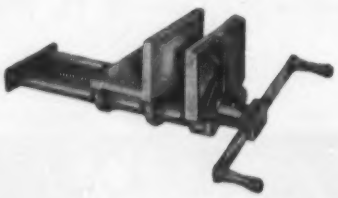
Herbert Detrick, Parma High School, and Eugene Thompson, Shaker Heights Junior High School, are vice-presidents. George Tilley, St. Edwards High School, is secretary, and Robert Boyer, Cuyahoga Heights High School, is treasurer.

Scholarship Winner

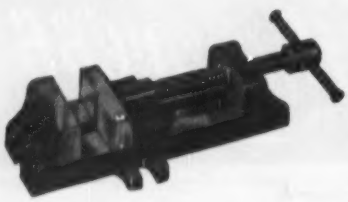
GEORGE TILLEY, a 12th-grade student of Ted Elmgren at Westchester High School, Los Angeles, is the winner of the first annual scholarship awarded by the Southern Section of the California Industrial Education Association. The scholarship, which is made possible by donations from commercial exhibitors at the Southern Section convention, is awarded to a twelfth-grade boy who plans to become an industrial-arts teacher. The first winner was announced at the Southern Section convention in Ventura in January.



machinists vise



woodworkers' vise



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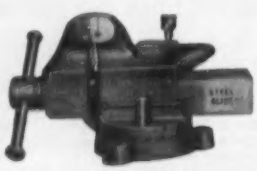

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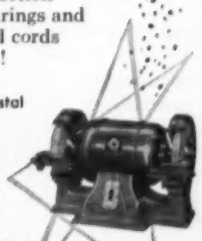

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Project Contest

THE Industrial Arts Club of Illinois State Normal University is sponsoring a project contest at the annual industrial-arts round-up at the university campus, May 5. The projects, which must be made in industrial-arts classes during the current school year, will be divided into senior-high division and junior-high division for judging.

New Fraternity Chapter

A NEW chapter of Iota Lambda Sigma was recently installed at Southern Illinois University, Carbondale. A team from the honorary fraternity at Purdue University initiated and installed the new group, known as Psi Chapter.

Oklahoma Officers

ROBERT K. PHELPS of Carnegie, Okla., was elected president of Oklahoma Industrial Arts Association for 1956 at the recent annual meeting of the association in Oklahoma City.

Denton Floyd of East Central school, Ada, was named vice-president, and C. L. Hill of the Oklahoma A & M College, was elected secretary-treasurer. ★

Safety Check List

To insure a safe environment in school shops, a National Standard School Shop Safety Inspection Check List has been developed by the Joint Safety Committee of the American Vocational Association and the National Safety Council.

The check list, which was drawn up in response to a major recommendation of the first President's Conference on Industrial Safety, is designed to facilitate regular inspections of the school shop and to pinpoint the factors that need checking. The major categories in the list are general physical condition, housekeeping, equipment, electrical installation, gas, personal protection, instruction, accident records, and first aid.

The check list is available from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. Cost is $1 for a packet of 50.

European Tour

AN eight-week tour to European countries, especially designed for persons in vocational and practical-arts education, has been announced for the summer of 1956. The trip, called a Cultural and Professional Improvement Holiday Abroad, has been planned by Blanche Nechanicky, supervisor of industrial education for the New York State Education Department, in cooperation with the New York State Teachers College, Buffalo, and Simmons Tours, Inc. Miss Nechanicky will be hostess-director of the tour.

The tour will leave New York City by air on July 2 and return by air on August 25, after visits to Ireland, England, France, Switzerland, Germany, Austria, and Italy.

Information concerning the tour is available from Miss Nechanicky at the New York State Education Department, 23 S. Pearl St., Albany.

The Crow Electri-Kit for Beginners and the Crow Basic Electronics Kit have brought electricity and electronics into thousands of schools . . . schools where these subjects were long considered too difficult or too expensive to teach.

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Convention Calendar

Wisconsin Association for Vocational and Adult Education, Loraine Hotel, Madison, May 4-5.

Industrial-Arts Spring Conference, New York State Teachers College, Oswego, May 10-11.

North Carolina Industrial-Arts Association, Greensboro, May 11-12.

Georgia Vocational Association, Biltmore Hotel, Atlanta, June 7-8.

Pennsylvania Education Association, Dept. of Practical Arts and Vocational Education, Eagles Mere, June 19-21.

International Graphic Arts Education Association, Santa Barbara College, California, August 5-10.

Louisiana Vocational Association, Southwestern Louisiana Institute, Lafayette, August 6-10.

Texas Vocational Association, Gunter Hotel, San Antonio, August 9-11.

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instructional Resources

Vocational Education and Practical Arts in the Community School. Byram and Wenrich. New York: The Macmillan Company, 1956. Pp. x + 512. $5.50.

The authors of this book have used an unusual approach to their subject in that they have taken it for granted that all of the areas of vocational education have common elements rather than organizing their material around each of these traditional fields.

With this in mind, they have focused their attention on the community as a whole, and have avoided treating each type of vocational education as an entity in itself. While this method of attack varies from the conventional one commonly used, it is interesting and thought-provoking.

The primary purpose of the book is to assist those who are interested in this phase of education in understanding the function of vocational education and practical arts in the modern community school. Teachers in these fields will find in it suggestions on practices and procedures which they may find helpful in the situations in which they are teaching.

The book should find a ready acceptance as a text in college classes.

Harold M. Byram is professor and chairman of agricultural education service, Michigan State University. Ralph C. Wenrich is professor and chairman of vocational education and practical arts, University of Michigan.

Sheet Metal Layout Simplified. Vol. I. Reid. Ann Arbor, Mich.: Edwards Brothers, Inc., 1954. Pp. 224. $5.50.

This is a thoroughly practical treatise which deals with the more obscure problems encountered in industrial sheetmetal practice. Short-cut methods, as used by the practical sheetmetal worker, are applied in the solution of the problems presented.

Steps to be followed in development of each pattern are given in detail, and mathematical calculations have been reduced to a minimum.

This is not merely a reference book, it is a compilation of standard jobs, with the necessary directions for actually laying out the work. Practical sheetmetal workers should be able to use it constantly in their everyday work. Vocational teachers, who are preparing young people for entrance into the trade will find it to be helpful too in orienting their pupils in regard to the actual conditions prevailing in industry.

While there are a few problems included which deal with elementary geometry, the book is designed for individuals who possess a knowledge of the basic principles of geometry and orthographic projection, as well as having a working knowledge of blueprint reading.

Hugh B. Reid is instructor of sheetmetal drafting in the Wilbur Wright Technical Institute, Detroit.

Oxyacetylene Welding. 4th Ed. Potter. Chicago: American Technical Society, 1956. Pp. 140. $2.50.

This is the fourth edition of a book that has proved to be one of the most popular treatises in the field. This new volume has been completely revised to include the modern methods that have been developed since its original publication.

It is a practical text on the use of oxyacetylene welding equipment. Contents are based on actual shop practice which makes it valuable for the beginner as well as for the experienced craftsman. The book is clearly written, and it reflects the experience of the author.

Morgan H. Potter was formerly instructor of welding in Dunwoody Industrial Institute, and is a member of the American Welding Society.

Automatic Transmissions Simplified. Purvis. Chicago: The Goodheart-Willcox Company, Inc., 1956. Pp. 396. $5.45.

In view of the phenomenal growth in the application of automatic transmissions to modern cars, this book is quite timely. While it deals with an obscure subject it should be of interest

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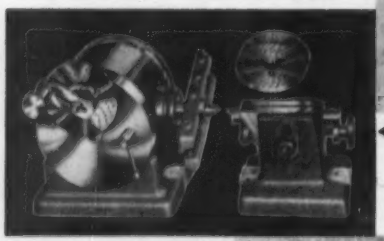

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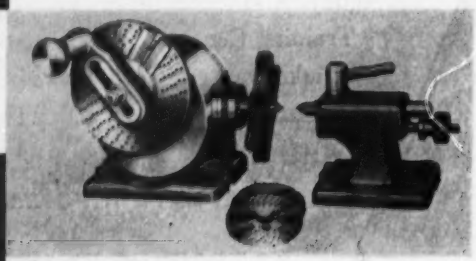

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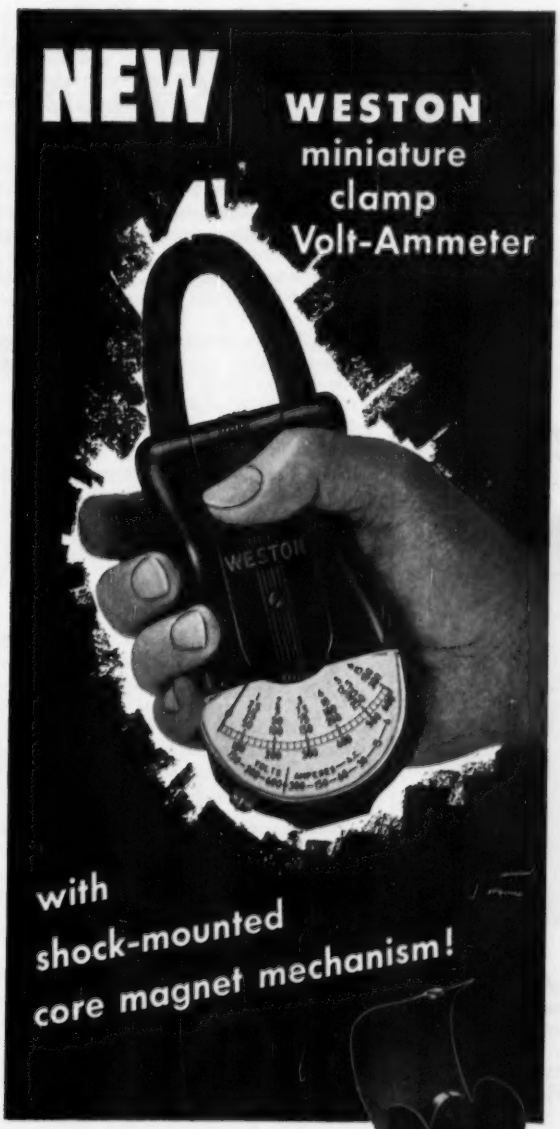

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to anyone who owns a car. However, its real value lies in its usefulness to servicemen, auto salesmen, and students in auto-mechanic classes.

To these three groups the book is indispensible since it contains well-illustrated explanations of the various types of automatic transmissions, and it describes how the equipment should be disassembled and reassembled. Common defects as well as how to remedy them are discussed.

Jud Purvis is technical editor for *Motor Service* magazine.

Units in Hand Woodworking. Douglass and Roberts. Wichita, Kans.: The McCormick-Mathers Publishing Co., 1955. Pp. 160. $ .75.

This book is intended to be used as a text in a course in elementary woodworking. It is divided into two groups of units, one dealing with information, the other with the operations called for in manipulative processes covered. By this means the job of the teacher is simplified since the units are short enough to come within the receptive capacity of younger pupils.

The various processes are well illustrated which should be helpful as a follow-up to the customary class demonstrations that are given.

Working drawings for several projects are included and accompanying the book is a comprehensive test which, if given at the beginning and the end of the course, will indicate progress the pupils have made.

J. H. Douglass is assistant principal, Vocational High School, Winfield, Kansas. R. H. Roberts was formerly director of industrial arts, public schools, Tulsa, Oklahoma.

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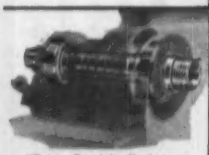

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SHELDON PRECISION LATHES are standard in leading vocational schools and industrial arts shops. They are of modern industrial design — in weight, power, capacity, speed range, extreme accuracy, safety, ruggedness and long life. Hence they permit practical shop courses and worthwhile projects.

They accustom students to "big lathe" power and controls; to big lathe "feel" and performance, building student confidence satisfaction and skill. Still they are safer, with new safety switches, aluminum shear pins, safety color code, and all gearing, belts and drive pulleys completely enclosed.

They minimize supervision and work load requirements for instructors. They end laborious and costly maintenance. The large "Zero Precision" Taperer Roller Spindle Bearings hold their accuracy in spite of student abuse. Bearing maintenance is reduced to a fractional turn of a take-up collar after long hard usage.

Produced by modern methods in a specially equipped machine tool plant Sheldon Lathes are priced to school budgets.

Write for catalog describing 10", 11", and 13" accessories and attachments, swing lathes, Milling Machines and Shapers.

SHELDON MACHINE CO., INC.

4260 N. Knox Ave., Chicago 41, Illinois

Fundamentals of Carpentry. 2nd Ed. Durbahn. Chicago: American Technical Society, 1956. Vol. I. Pp. xii + 374. $3.95. Vol. II. Pp. xii + 512. $4.95.

These books cover completely and thoroughly the whole field of the carpenter trade, from the most elementary information to the more difficult problems that arise in building construction.

The contents of Volume I include information about the carpentry trade, history of tools, use of the steel square, principal woods used in the building industry, insulation, and blueprint reading.

In the second volume the plans of a house are provided, and the discussion of various subjects covered is related to these. These subjects include foundation form work, wall and roof framing, exterior and interior finish trends, and the use of the level transit.

The high-school pupil, apprentice, and qualified craftsman, will find in these books much of interest and of value.

Walter E. Durbahn is chairman of the vocational department in the Highland Park, Ill., high school. He is a practical carpenter who has had many years of experience as a craftsman and as a teacher.

Pamphlets:

Career Opportunities in the Graphic Arts Industry is a 31-page booklet which presents the career and vocational opportunities offered by the graphic-arts industry. Text, tables, and charts were prepared by ATF. Free copies are available from the Education Council of the Graphic Arts Industry, Inc., 719 Fifteenth St., N.W., Washington 5, D.C.

Apprenticeships and the Participation of the Public Schools in the Program is a pamphlet explaining the history, objectives, and principles of modern apprenticeship. It is well-illustrated. Published by the California State Department of Education, Sacramento, Calif.

Guide for Product Designers is a new edition of this booklet which describes the basic and special Presdwood products and their properties. It also tabulates their available sizes, describes working and finishing methods, and illustrates various finishes such as offset printing and wrinkle-finish paint. The booklet is illustrated with drawings and photographs. It may be obtained from the Service Bureau, Masonite Corporation, 111 West Washington St., Chicago 2, Ill.

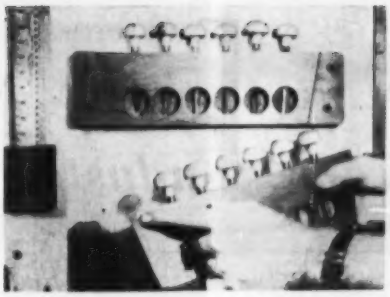
Audio-Visuals:

Welding Advances with Aluminum is a color film describing modern developments in inert gas and shielded arc welding of aluminum. It deals with both the tungsten-arc and consumable-electrode welding processes including the basic welding techniques for these methods. Running time is 28 minutes. Available on loan from Association Film libraries in: Ridgefield, N.J. (Broad at Elm), Chicago (79 E. Adams St.), Dallas (1108 Jackson St.), and San Francisco (351 Turk St.).

An Introduction to the Heat Engine is a black and white, 20-minute film which explains how engines provide inexpensive, efficient, dependable power for moving, building, manufacturing. An illustrated catalog describing this and other films and telling how to borrow them may be obtained from Shell Oil Co., 50 W. 50th St., N. Y. 20, N. Y.

Practical and easy to build

Double-Bevel Tool Holder



By Bernard R. Josif

Department of Industrial Arts
Ball State Teachers College
Muncie, Indiana

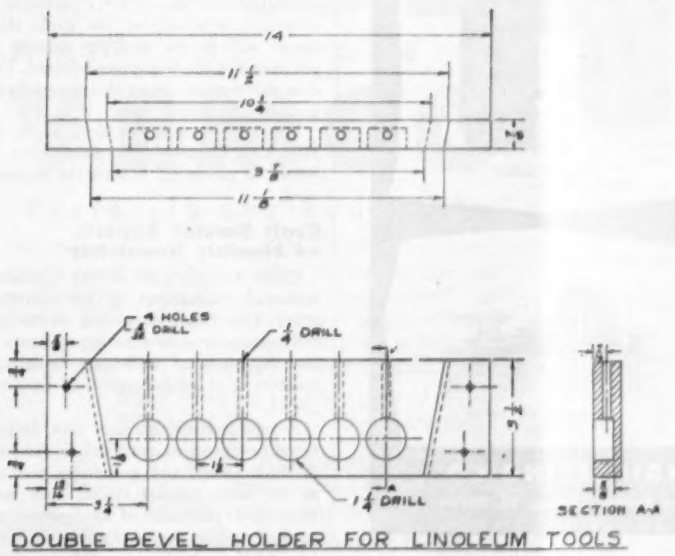
A TOOL holder, such as the double-bevel linoleum tool holder shown here, promotes the care of tools and equipment and cultivates proper safety habits among the students. Exhibiting tools in this manner saves space, the tools remain in logical sets or groups, and tool loss is reduced.

This tool holder is most convenient when tools are arranged in sets or groups, as, for example, the linoleum carving tools pictured. Other suggested tools that could be mounted in this manner include bits, chisels, wrenches, drills, files, punches, and leather modeling tools.

The unique feature of the tool holder is the double-bevel construction, which permits the tool to be held securely and safely and prohibits the tool holder from falling. The holder is easily freed and removed by merely tapping beneath the lower edge of the holder. It then may be taken to the work station and set in an upright position, eliminating several trips to the tool panel.

The construction of the holder is not complicated. It requires one piece of solid maple wood $\frac{7}{8}$" x $3\frac{1}{2}$" x 14", sanded smooth on all sides. An expansive bit, size $1\frac{1}{4}$" diameter, is used to drill six holes on the face of the wood to a depth of $\frac{5}{8}$". This permits viewing and aids in the selection of tools. On the top edge six additional holes are drilled vertically with a $\frac{1}{4}$" bit to intersect the $1\frac{1}{4}$" holes, so the linoleum cutters may be inserted in the holder.

After drilling the four screw holes, a sliding T-bevel square is set at 10° and lines are marked across the face and top edge of board to be cut with a back saw. The three separate pieces are sanded and finished with either clear lacquer or varnish and then assembled on the tool panel. ★



DOUBLE BEVEL HOLDER FOR LINOLEUM TOOLS

NEW PLASTIC FILM DISCOVERY!

DuPont MYLAR* POLYESTER FILM

Strongest of All Plastic Film Actually Used for Boat Sails—Has Amazing Characteristics of Extremely High Tensile Strength and Durability, being Able to Withstand Temperatures Ranging from Minus 80 deg. to 300 deg. F.!

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the Remarkable New Liquid Vinyl Plastic that Produces Foliage so Realistic and Life-Like it's Hard to Tell It From Live, Growing Leaves when Viewed from Just a Few Feet Away!

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SCHOOL PRODUCTS CO. 330 E. 23rd St. New York

news from Industry

(Circle the numbers on the card in this issue to secure the items listed.)

Electronic Training Aid Announced by Philco

A new type of electronic training device has been announced by the Philco TechRep division of Philco Corporation. It includes an instructor's console for classroom instruction and demonstration, and laboratory equipment for practical experience in electronic circuit systems, according to the manufacturer.

Complete lesson plans, course outlines, and laboratory manuals are also included.

More than 85 panels and corresponding laboratory chassis are available to teach electronic fundamentals, vacuum-tube characteristics, a-m and f-m radio, television, and radar, the manufacturer claims. All circuits operate singly or in combination with others so that progressively more complex electronic systems may be built up, block by block. All components are plug-in.

Additional information may be had by writing to Philco Corp., TechRep Div., 22nd St. and Lehigh Ave., Philadelphia 32, Pa., mentioning SCHOOL SHOP; or *circle no. M-1 on the business-reply card.*

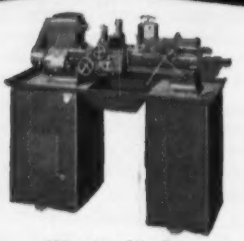
Logan
LATHES GIVE THE STUDENT INDUSTRIAL TOOL EXPERIENCE

14" swing, 1" collet 1⅜" spindle bore

The school shop equipped with Logan Lathes gives its students the big advantage of learning on an actual industrial tool. Logan sustained accuracy and versatility permits a broad range of industrial type projects for advanced classes. Logan safe-operation features and rugged construction are of special value with novice groups. No other lathes of comparable specifications match these Logans for economy.

Screw Cutting and Turret Lathes In a Wide Range of Sizes 9", 10", 11", 12" and 14" swing, all with Logan advanced design features.

12" swing, 1" collet 1⅜" bore



11" swing, 1" collet 1⅜" bore

10" swing, ½" collet 25/32" bore

9" swing, ½" collet 25/32" bore

See your Logan dealer, or write for catalog information.

LOGAN ENGINEERING CO.
4901 West Lawrence Avenue, Chicago 30, Illinois

Portable Fire Extinguisher Made by Lenk

A new type of fire extinguisher is now available. Made by the Lenk Manufacturing Company, it is an aerosol spray type which, according to the manufacturer, is capable of putting out all types of fires, including oil, grease, electrical, and rubbish.

When in use, the manufacturer states, the Lenk Fire Extinguisher can produce a spray over 10' long.

For more information write to the Lenk Mfg. Co., 30-38 Cummington St., Boston 15, Mass., mentioning SCHOOL SHOP; *or circle no. M-2 on the business-reply card.*

Guide Shows Correct Hammer and Nails to Use

A hammer and nail guide by the Estwing Manufacturing Company has been announced.

The firm states that the job of selecting the proper type of nail for a particular task is simplified. One side of the guide shows the proper nail to use, and the number of nails per pound in the penny size selected. The other side of the guide shows the correct hammer to use for each type of work.

For more information write to the Estwing Mfg. Co., Rockford, Ill., mentioning SCHOOL SHOP; or *circle no. M-3 on the business-reply card.*

Craft Service Reports on Monthly Newsletter

Craft Service tells of the acceptance by handcraft enthusiasts of its monthly newsletter, *Chit Chat.* According to the firm, the publication is now reaching a figure well in the thousands of individual hobbyists, craft teachers, and administrators of handcraft programs.

A typical issue, the firm says, includes editorial comments on craft trends, announcement of trade shows, and new items now available in the more popular crafts. Each issue also features a full page of instructions on some project such as candle making, linoleum printing, a bun basket, or a metal bracelet.

(*Continued on page* 40)

THE PENNSYLVANIA STATE UNIVERSITY
Department of Industrial Education

1956 Summer Session
Inter-Session ..... June 11-June 29
Main Session ..... July 2-Aug. 11
Post Session ..... Aug. 13-Aug. 31

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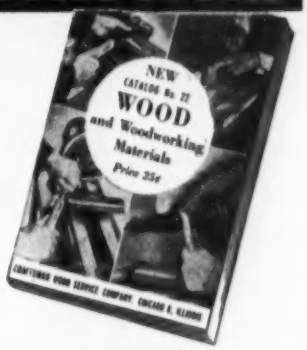
ALL NEW, COMPLETE CATALOG OF WOOD & WOODWORKING EQUIPMENT *FREE* TO INSTRUCTORS

Finest Domestic and Rare Woods . . . Molding . . . Tools ALL AT LOWEST PRICES



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Illustrated is the VEMCO instrument set No. A171L, consisting of 6½" compass, 4½" compass, 6½" divider, pen attachment, Microliner ruling pen, and box of leads and points. Packed in smart California saddle leather pocket case.

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All-steel construction of VEMCO drawing instruments provides lighter weight, as well as strength and rigidity necessary for the "heavy-duty" demands of modern drawing-room practice. VEMCO drawing instrument sets are available in different combinations to suit every drawing need.

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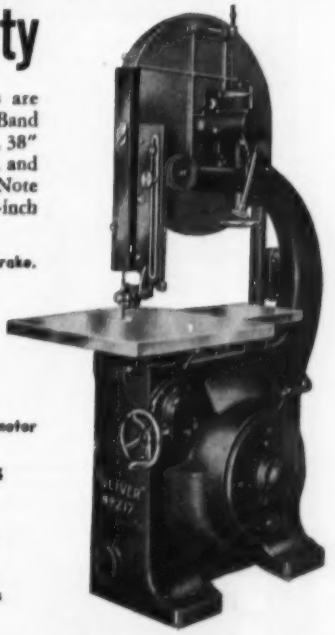
OLIVER Band Saws give smooth, accurate work with utmost safety

Industry's favorite Band Saws are *right* for teaching. Oliver Band Saws are made in 18", 30", 36", 38" sizes. They are easy to operate, and are built for rugged service. Note these features of the Oliver 30-inch Band Saw:



- Upper wheel has automatic brake.
- Shut-off foot brake for lower wheel.
- High-speed ring-disk always run true.
- Self-locking table tilts 45° to right, 10° left.
- Efficient dust-collecting system.
- Heavy one-piece frame keeps motor arbor permanently aligned.

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Boring Machines	Shapers
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Mortisers	Wood Trimmers
Planers	Tenoner
Sanders	

OLIVER MACHINERY COMPANY
Established 1890 **GRAND RAPIDS 2, MICH.**

For more information write to *Chit Chat* Editor, Craft Service, 337 University Avenue, Rochester 7, N. Y., mentioning SCHOOL SHOP; or *circle no. M-4 on the business-reply card.*

Skil Introduces "Jack-of-All-Kits"

A 15-piece kit, the "Jack-of-All-Kits," has been placed on the market by Skil Corporation. It includes two fully powered tools, a 4¼" Skil Saw and a ¼" drill and 13 accessories.

The kit, Skil states, makes a portable power saw and a portable power drill available to the user at the same time for alternate use on a job, saving the time and bother of converting one tool into another by interchanging attachments. The company says that the 4¼" saw will handle all around-the-house sawing jobs, cutting plywood, wallboard, sheathing, and other materials. The ¼" keyless chuck drill will sand, buff, and polish, as well as drill. The kit also includes seven high-speed twist drills, a 5" rubber backing pad, a 5" lambswool polishing bonnet, a sanding disc, a rip fence, one hard-tooth disposable saw blade, and one arbor adapter.

More information may be obtained by writing Skil Corporation, 5033 Elston Ave., Chicago, Ill., mentioning SCHOOL SHOP; *or circle no. M-5 on the business-reply card.*

new "package deals" on machinery for your shop!
Deal No. 1 $1295.00 delivered
Three new "package deals" of Di-Acro Precision Machines are now offered to school shops only at a new low price! Brake and Roller are Spartan models, designed especially for schools. Bender, Notcher and Shear are industry proven. Benches of heavy gauge steel are designed for efficiency and long wear. Special prices include freight to your school.
Spartan Model 24 Roller
Spartan Model 24 Box and Pan Brake
Di-Acro Shear No. 4
Di-Acro Notcher
Di-Acro Bender No. 2
Bender Accessory Package
Bender Stand
Machinery Stand
Reg. prices add up to $1427.00 plus freight.
Deal No. 2 $965.00 delivered
Spartan Model 24 Roller
Spartan Model 24 Box and Pan Brake
Di-Acro Shear No. 4
Di-Acro Bender No. 1A
Bender Accessory Package
Machinery Stand
Reg. prices add up to $1055.50 plus freight.
Deal No. 3 $735.00 delivered
Spartan Model 24 Roller
Spartan Model 24 Box and Pan Brake
Di-Acro Bender No. 2
Bender Accessory Package
Bender Stand
Machinery Stand
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All Di-Acro products are backed by one year's warranty.
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O'NEIL-IRWIN MFG. CO.
358 8th Ave., Lake City, Minn.
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School
Address

Series of Press Brakes Now Available

Dreis & Krump Manufacturing Company announces a new series of press brakes for bending and forming sheetmetal and steel plate.

One of the series, "A," according to the firm, has a capacity of 12 gage to 48", 14 gage to 72"; a 2" stroke; a 3" ram adjustment; a 7¼" die space, and a 1½ hp motor.

Three other press brakes complete the series.

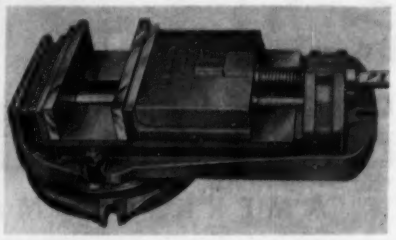
The manufacturer asserts that the new machines are all-steel, have welded frames, and deep section beds and rams of rolled steel plate. These features, it is said, assure permanent alignment and minimum deflection under load. Also, a double-end drive from the intermediate shaft eliminates strain in the intermediate shaft providing even application over the length of the ram for accurate bending. For more information write to Dreis and Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36, Ill., mentioning SCHOOL SHOP; *or circle no. M-6 on the business-reply card.*

Milling Machine Vise Announced by L-W Chuck Co.

A flange construction milling machine vise, the "Mogul," has been announced by L-W Chuck Co.

The manufacturer's specifications for the vise include a ⅝" thick steel jaw, 8⅝" wide and 2 3/16" deep, and which opens 6" when in place. The firm claims there is a full-length bearing on the ground bar and machined ways.

All surfaces are ground for accuracy and the work-holding surfaces are always held at



true right angles or parallel to the table, according to the company.

For additional information write to the L-W Chuck Co., 69 S. St. Clair St., Toledo 4, Ohio, mentioning SCHOOL SHOP; or *circle no. M-7 on the business-reply card.*

Tolco Improves Four-Student Bench Tops

The Tolerton Company has redesigned its four-student bench tops and the new angular steel-splined tops will be available on all four-student benches in the popular 2¼" x 54" x 64" size.

According to the company, tops of this size have previously been constructed with either 5" or 5½" laminated end battens fastened in various ways across the end of the bench which sometimes caused trouble due to moisture absorption during damp seasons of the year.

The new Tolco steel-splined top eliminates the battens that have been a source of trouble

Job-Designed!

PROTO Professional-Quality Pliers

for Your Needs!

NEW! Multiple-Groove Joint Utility Plier. Gives you a wide range of openings for hundreds of jobs. 242-7½", 243-9½". ***NEW! Mighty Midget Pliers for Electronics.*** You'll like the feel of these pliers for working on small objects in tight places. 6 models, 4" to 4¾" long. ***NEW! "Snip-Grip" Plier.*** Plastic inserts in cutting edges hold end of wire after you cut it. Prevents electrical shorts, protects you from injury. 204T-4½", 206T-6". ***NEW! Electronics & Ignition Cutting Plier.*** Cutter is close to tip. Spring opens long narrow jaws. ***Also NEW! Comfortable "Handeze" Plier Grips.*** Slip on easily, fit tight, are long wearing. Reduce fatigue. ***NEW! V-Notch Wire Stripper.*** Two V-notches cut through insulation, slight side pressure strips it. 298-5½". ***And...the Sensational Multi-Plier!*** Increases grip 10 times! 234-8". For all PROTO pliers, see your dealer, or send 10¢ for catalog of entire line to **PROTO TOOLS**

5552

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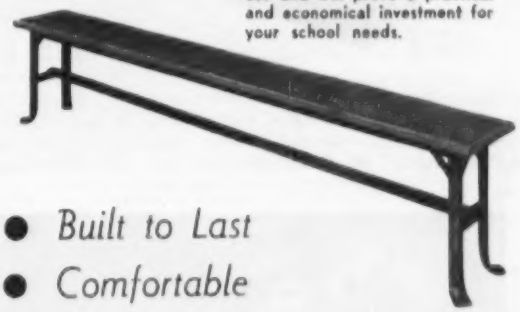
Eastern Factory, Jamestown, N.Y.
Canadian Factory, London, Ont.

PROTO TOOLS

Locker Bench

Angle Steel offers hardwood or steel top locker benches in various slengths from 4' to 8'. Benches are 12" wide, 18" high. Finished in olive green or grey. Shipped set up ready for use. These benches are built to withstand the hardest use and will prove a practical and economical investment for your school needs.



- *Built to Last*
- *Comfortable*

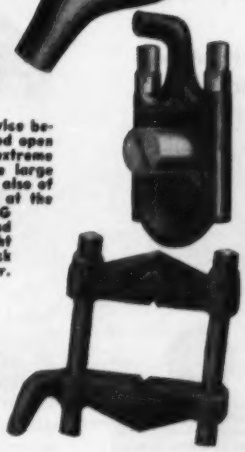
Send for Complete Catalog

Angle Steel Inc.
Plainwell, Michigan

ARMSTRONG

Drop Forged

LATHE DOGS



ARMSTRONG Lathe Dogs give extra service because they are drop forged from selected open hearth steel and are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

Write for catalog

ARMSTRONG BROS. TOOL CO.
5252 West Armstrong Ave.
Chicago 30, Illinois
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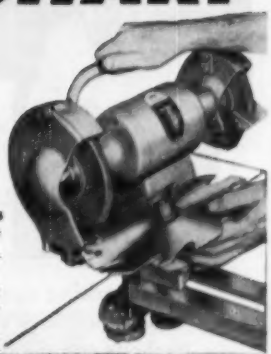
KEEP SHARP

with the new

FOLEY GRINDER



SHARPENS:

- All rip, cross-cut and combination circular saws 5" to 44" in diameter
- Dado heads
- Rotary mower blades
- Ice Skates
- Planer knives
- Scissors, shears
- Plane blades, chisels
- Other sharp edged tools
- Sands, buffs, polishes

You'll wonder how you ever got along without it, once you have the new Foley 314 Grinder in your shop. This versatile, high quality, low cost grinder does a beautiful job on all types of circular saws and dado heads—also has handy attachments for practically all sharp edged tools. It's a marvel for operating ease and speed, capacity and precision work—compares favorably with grinders costing two to three times as much. Meets safety standards. Fully guaranteed for one year. Write today for full information and prices on Foley 314 Grinder and attachments.

SEND COUPON TODAY

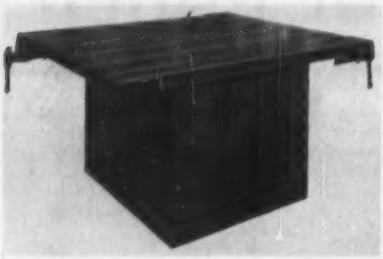
FOLEY MFG. CO., 3400 5th St. N.E., Minneapolis 18, Minnesota
Send full information on Foley 314 Grinder.

Name_____

Address_____

City_____ State_____

on such large tops. The new method, the manufacturer states, still furnishes a 100 percent



hard-maple work surface over the entire top area and the heavy-steel spline will prevent bowing. For more information write The Tolerton Company, 265 N. Freedom Ave., Alliance, Ohio, mentioning SCHOOL SHOP; *or circle no. M-8 on the business-reply card.*

Kett Tool Introduces Panel-Cutting Saw

A heavy-duty, panel-cutting saw has been announced by the Kett Tool Company. Called the "Panel Master," the manufacturer believes it to be an economical answer to the problems of heavy-duty cutting, and the trimming of sheets and panels and any thin sections of metal or soft, rigid materials.

The saw has a 2" diameter saw blade with a cutting depth of 3/8". It has a heavy-duty, industrial-type, 110-v ac/dc, portable, 5/16"-capacity electric drill motor. The maker asserts that this powers the saw easily through mild steel up to 16 gage, aluminum up to 3/16", fiberglass, masonite plywood, plastic and plastic laminates, up to its full capacity.

The manufacturer also says the saw is equipped with ball bearings throughout. Straight-line, contour, and depth-controlled cutting is made easier, the firm believes, by the modern gun-sight guide and adjustable shoe.

Additional information may be had by writing to the Kett Tool Company, 5 East Third St., Cincinnati 2, Ohio, mentioning SCHOOL SHOP; *or by circling no. M-9 on the business-reply card.*

Announce Amplifier for Music, PA Systems

A new rack-mounted, 100-watt, high-fidelity amplifier for music and public-address systems has been announced by Electro-Voice, Incorporated.

This amplifier — the E-V Circlotron Model A100—according to the firm, uses the Wiggins Circlotron circuit. D-C output current is removed from the output transformer through use of a bridge circuit and all switching transients are eliminated through unity coupling between output tubes. The manufacturer also claims that a wide frequency response range is more easily attained with this amplifier because it has less capacity distribution and leakage reactance.

The maker goes on to say that the damping factor control, adjustable between 0.1 and 10, permits perfect coupling between the amplifier and loudspeaker system, eliminating the usual loss of bass from overdamping or hangover due to underdamping.

For more information write to Electro-Voice, Inc., Buchanan, Mich., mentioning SCHOOL SHOP; *or circle no. M-10 on the business-reply card.*

Fay & Egan Introduces New Tilting Arbor Saw

A newly-designed, universal tilting arbor saw for use in mitering, trimming, dadoing, gaining, and allied operations, is being introduced by the Fay & Egan Company.

The new machine—Model 511-B—is designed to do the following, according to the firm: cut off stock 1" thick to 18" wide; rip 24" wide to the right or 18" to the left; with the saw at a 45° angle, it will rip 3½" thick with a 16" saw (an 18" saw will cut through stock 5" thick), and the standard arbor will accommodate dado heads up to 2" wide and

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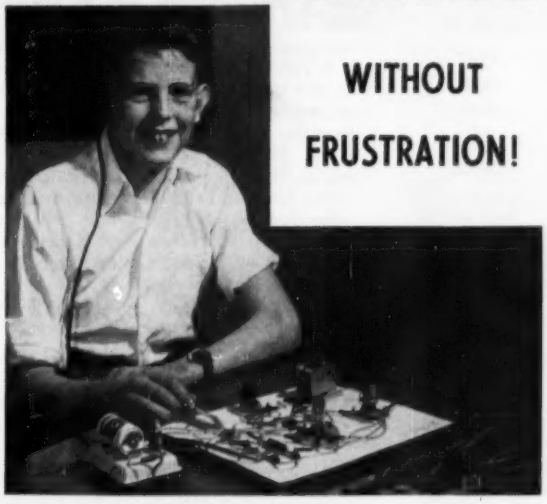

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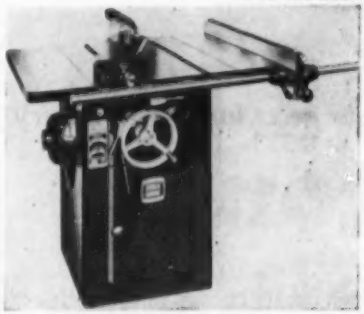

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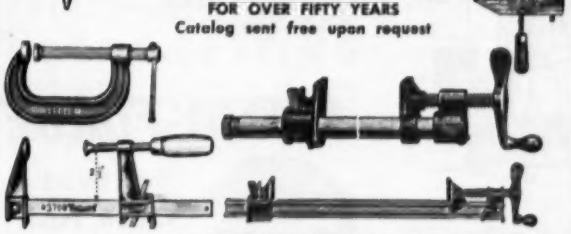

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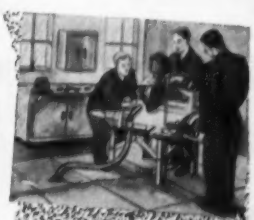

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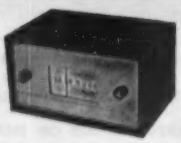

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can be arranged for heads up to 4" wide on order.

The firm states that the column of the new saw is steel fabricated, with an extra-large floor base. The table, a heavy ribbed casting, surface-ground, is mounted on a base 44" x 40". It is provided with tee slots for miter fences on each side of the saw, and a hole for drop-in self-locking, safety-throat plate. The arbor can be angled up to 45°. The unit is powered by a 5 hp, 3600 rpm fan-cooled motor, which mounts directly on the arbor, running in deep groove precision ball bearings, the firm states.

For further information write the Fay & Egan Co., 2011 Eastern Ave., Cincinnati 2, Ohio, mentioning SCHOOL SHOP; or *circle no. M-11 on the business-reply card.*

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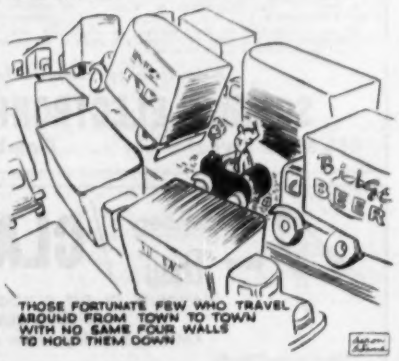

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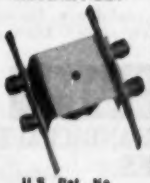

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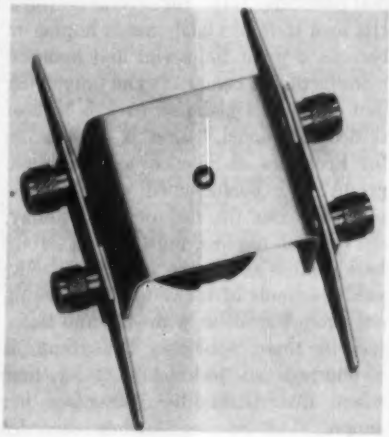
tapping, prying, and readjusting required by the usual trial and error method is entirely eliminated, the company states, thus speeding



up the blade-setting operation. Because the blades are set accurately, they require less resharpening and resetting. For more information write Magna-Set Company, 632 New Haven Ave., Milford, Conn., mentioning SCHOOL SHOP; or *circle no. M-12 on the business-reply card.*

South Bend Lathe Issues 50th Anniversary Catalog

South Bend Lathe Company introduces new and improved products in its Golden Anniversary catalog, recently published.

The firm states that the catalog, bound in a gold cover, contains 80 pages and is a convenient size for the standard letter file drawer.

Included in the catalog is the complete line of South Bend engine lathes, toolroom lathes, turret lathes, pedestal grinders, and drill presses. Also, according to the company, shown for the first time are the new South Bend vertical-spindle milling machine and a new 13" swing-turret lathe. Attachments, chucks, tools, and accessories are included for all South Bend machines.

For more information write to South Bend Lathe Works, South Bend 22, Ind., mentioning SCHOOL SHOP; or *circle no. M-13 on the business-reply card.*

New Literature:

Copper Craft is an illustrated four-color, easy-to-read instruction and project manual by the Tepping Studio Supply Company. It features copper forms, jewelry findings, free forms, copper accessories, copper trays, copper enamels, instructions and copper projects. For a copy of the catalog send fifty cents to Tepping Studio Supply Co., 3517 Riverside Drive, Dayton 5, Ohio, mentioning SCHOOL SHOP; or *circle M-14 on the business-reply card.*

A Catalog of Selected Project Equipment and Supplies for crafts in the school shop has been issued by DonJer Products Company. The catalog includes listings and prices of hundreds of items. For more information write DonJer Products Company, 1398 Utica Ave., Brooklyn, N.Y., mentioning SCHOOL SHOP; *or circle no. M-15 on the business-reply card.*

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Washington . . . *from page 48*

Senator Kerr introduced the bill, in that particular form, for several reasons: His own state of Oklahoma is hoping to become a great industrial and aviation manufacturing center. ("The only thing that can hold Oklahoma back is lack of skilled personnel," said a spokesman for Frontiers of Science, an Oklahoma group of businessmen and industrialists.) But the technician of today, the Senator reasons, must have a strong background of science and math. The public schools of today are not turning out enough students with skill and training in these subjects. The result is a shortage of technicians at a time when Red Russia is increasing her supply. The Senator further concedes that the federal government should do something to strengthen science teaching in the public schools, but he sees no hope for any Congressional action on that score. He admits, as do many others, that only a measure which carries the charmed label of "vocational education" has any chance in Congress today.

The bill may run into opposition both from vocational and nonvocational spokesmen. But nevertheless it is significant—and is something to ponder—as an index of the state of education today.

Looking Ahead in Foremen Training.—Technological change—to avoid using the word automation for the moment—is changing the nature of the foreman's job. It has been a long time since the U.S. Office of Education has taken a good look at the ways in which foremen are being trained or retrained. Early this summer, this deficiency will be corrected. John Walsh, chief of the Trade Industrial Education branch, is busy setting up a national conference for supervisory training. He says the meeting will begin "pulling together" techniques and methods used throughout the country for supervisory training and will search for ways to spread the news about the best techniques.

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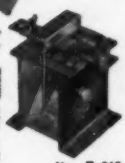

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This appears to be an ideal time for a reexamination of how foremen are being trained. The large industry is looking for a new type of foreman—one skilled in human relations. Small industry, on the other hand, still needs the foreman who can teach the job and if necessary, do the job himself. These dual trends have served to confuse foremanship training in many a locale. The proposed conference should do much to clear up confusion which may exist on the good ways to up-grade industry's supervisory skills.

Hunt to Leave USOE.—Dr. DeWitt Hunt, who was appointed about a year ago as federal specialist for industrial arts, is leaving at the end of this June. The position, paying about $9,000, will thus be vacant once again. Dan Hull, chief of the branch, is trying to locate a successor.

Meanwhile, we had a talk with another newly-appointed specialist in Dr. Hull's branch. His name is Ralph Beelke, who fills the post of specialist for education in the arts. All arts—but not industrial arts. That, the new staff member, made clear immediately. Nevertheless, we engaged Dr. Beelke in conversation in an attempt to see whether the fine-arts specialist had a point of view useful to industrial arts.

It appears that teachers of fine arts are today less concerned with representation ("let's draw this as we see it") and with appreciation ("see the fine light and shade on this picture"). They are interested in participation. (So far, the industrial arts are in line with this philosophy.) Dr. Beelke further maintains that the arts today should be creative rather than imitative; they should avoid the use of patterns; they should be problem-solving in nature.

"I think we should teach the arts, that is the fine arts, in such a way the pupil will understand that there is no single correct answer to a creative problem."

It is quite probable, we agreed, that the industrial-arts instructor has something to learn from the fine-arts teacher; but that fine-arts teachers may profit by the industrial-arts instructor's emphasis on precision, accuracy, and the importance of the practical. ★

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from Washington

by Michael Paca

Congress Gets Cordial.—In just a few days, the Senate will do what the House has done, that is, approve the sum of 29.3 million for vocational education. With that action, the goal set by the George-Barden Act will have been reached for the first time in history.

Although the Senate has not yet acted as this letter goes to press, educators here behave as if it were all done and finished. Their mood reflects it. "Everything is too good to be true," is one comment that found its way into our notes. It is a comment that might have been made either in the U.S. Office of Education, AVA offices, or even the NEA headquarters. For there, too, school people have sensed, and are somewhat amazed at, the strong appeal that vocational education has on Capitol Hill. NEA officials, who are suffering under the sting of Congressional neglect for their own school-aid measures, find it difficult to understand how vocational education, which two years ago was slated for a reduction of federal funds, has become the darling of educational legislation.

This popularity of vocational education is making some general educators, including those at the NEA, a bit uncomfortable. This became apparent when Senator Kerr (D., Okla.) introduced a bill to promote the education of science and mathematics. Now, of course, science and mathematics are subjects almost as sensitive and urgent as the atomic bomb was a decade ago. Congress and the Departments have become painfully aware that Red Russia is doing a top-notch job in science and math instruction—or at least so witnesses report (witnesses which include former U.S. official William Benton). Anything that would get the federal government involved in aiding science instruction should please the NEA—and this should be especially true of the Kerr bill which calls for $10,000,000 in federal funds. But it so happens that the Kerr bill, (S. 3271) was written as an amendment to the Vocational Education Act of 1946. That is, Mr. Kerr would use the machinery of vocational education to improve the teaching of science.

"Is the NEA prepared to endorse the Kerr bill?" we asked one NEA official. That's where the discomfort came in. For general educators do not like "piecemeal" legislation. They are unhappy about "specialized federal aid." They'd rather see a broad and unearmarked federal aid act to help improve all instruction in all subjects at all levels. They'd rather not endorse the Kerr bill. But to oppose it would put them in a negative position. And so their discomfort grows out of their lack of enthusiasm to be "positive" for the Kerr bill and the knowledge they dare not be negative.

Vocational educators, too, are somewhat undecided regarding the Kerr bill. As they see it, scientific education would become as much a part of their concern as are trade and industrial and home economics education. Each state would have to write a state science plan, just as it writes a T-and-I plan now. Where that would lead is uncertain—but initially it would lead to conflicts with the nonvocational systems and organization and to dislocation of the regular science instruction and teachers.

"Do you think your bill will pass?" we asked Senator Kerr. "I certainly hope it will," the Senator replied, and added that several scientific and technical associations had already given their approval. (The National Association of Science Teachers, which met in Washington last month, was privately unhappy about using the vocational-education machinery to beef up science, but refrained from saying so publicly.)

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